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TOWER SKULL, OXYCEPHALUS.

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This paper attempts to define more completely the clinical condition known as tower skull. Six cases are reported from the Department of Ophthalmology of the University of Wisconsin, with relatively complete and detailed histories, symptoms and general physical findings. The condition is more common than recorded cases might indicate. It must frequently pass unrecognized especially in the early stages when treatment would be most effective. To remove confusion with other skull deformities, a case of congenital idiocy is reported for contrast. It has been incorrectly ascribed to rickets and meningitis, but seems to be essentially a fault of development.

During the past five years seven cases of tower skull (oxycephalus) have come under my observation, six presenting themselves for clinical study in our State institution and one consulting me privately. The severity of the condition varied from a moderate defect in vision with a comparatively slight skull deformity, to the most extreme type of pointed skull with marked reduction in vision due to optic nerve changes. It has occurred to me that this disease, hitherto considered extremely rare, must be more common than we have been led to believe. Since in a somewhat limited experience I have had the privilege of observing this rather large number, I feel that many cases go unrecognized.

Patients suffering from this disease have sought the advice of ophthalmologists owing to the important ocular changes accompanying the deformity. It therefore behooves us to acquire a more accurate knowledge of tower skull and further to acquaint our fellow practitioners with its signs and symptoms. Early diagnosis is essential if irreparable damage to the optic nerves is to be averted. The deformity may go unnoticed in the early years of life, therefore we should direct the attention of pediatrists particularly to the affliction.

Sharpe in his thoro review of the subject of oxycephaly in 1916 states that not more than twenty typical cases of severe "turmschädel," or tower skull, have been reported. Ophthalmologists have reported most of these. Since that date, however, many case reports are recorded in the literature, and there are a much larger number, therefore, from which more definite conclusions may be drawn. Brav in 1912 reviewed the literature up to that date as it relates to the ocular symptoms, summarizing the findings in eighty-five case reports, including two of his own. The appended bibliography consists of eighty-five cases, reported chiefly since 1916, in addition to a number appearing prior to that date which were not reviewed by Sharpe. Deductions are drawn from a combined survey of these case reports, together with my own.

It is difficult to form definite conclusions from a series of case reports by various authors owing to the lack of uniformity of the data supplied. Percentage figures are misleading. Since this disease is not common, however, and only a very limited number of cases come under the observation of one man, conclusions must be drawn from data thus compiled. Certainly some of the views of earlier observers are to be questioned after a study of the larger number of cases afforded by this lapse of years.

The disease, or perhaps more accurately speaking, malformation, has been studied thoroly in recent years, and excellent descriptions are to be found in some of the standard texts, particularly that of Schüller, in whose clinic the writer first had the opportunity of studying roentgenograms of this affliction. There is likewise a

very good description to be found in "Graefe-Saemisch Handbuch der Augenheilkunde" and also in the American Encyclopedia of Ophthalmology. Few diseases are accompanied by such a large variation of structural changes and physical signs.

DEFINITION. Briefly the condition might be described as a congenital malformation of the skull of unknown origin, perhaps developmental, due to premature synostosis or fusion of certain sutures of the base and vault, characterized by a high, pointed or dome shaped configuration of the skull, accompanied by exophthalmos of varying degrees, and marked reduction in vision due to secondary optic atrophy. The disease was first described by von Graefe in 1866, and later more thoroly by Michel in 1873, who definitely associated optic atrophy with cranial deformity.

TERMINOLOGY. The original term "turmschädel", or tower skull, is perhaps the most descriptive term of the deformity under consideration tho we often meet with oxycephaly, οξυς (sharp), κεφαλη (head), turricephaly, spitzkopf, acrocephaly, and others. Some writers, especially Sharpe, have used two terms, turmschädel, for the mild type, and oxycephaly for the severe form. This, I think, is confusing since the terms are merely different names applied to the same condition. I feel one might better select either term, reserving the variations in type for the subheading:

(A) The mild form, or dome shaped, tall head.

(B) The severe form, or high, pointed type in which there is often a protrusion at the bregma (junction of the sagittal and coronary sutures).

Dock prefers the term oxycephaly, and this term has been used in Osler's "Practice of Medicine." It seems to me, however, since the original descriptions of this disease bear the name "turmschädel", which translated gives us the English "tower skull," we should retain it. This courtesy is due these earlier writers for their zeal in acquainting us with this interesting anomaly. Also, it is equally descriptive and can not be subject to incorrect translation as in oxycephalus (ox head, as in some texts).

CLASSIFICATION (*Types of Synostosed Skulls*). Great confusion has arisen in the description of this disease, due not only to the variety of names used by different authors, but also largely to improper classification of the varying types of skull deformities resulting from premature synostosis. Schüller clearly defines three types of skull deformity due to premature synostosis; namely:

1. Turricephaly or tower skull, which is the short, broad, and abnormally high skull, the type under consideration.

2. Scaphocephaly (scaphoid head), which is a form of dolichocephaly, the long and narrow skull.

3. Plagiocephaly (slanting head), is a skull with asymmetric stenosis.

Undoubtedly many of the earlier cases reported belong to the second and third groups and therefore do not conform to the fairly uniform and typical findings of the first.

PATHOLOGY. Premature synostosis, or fusion of the basal and transverse sutures, is accepted by most authors as the pathologic change causing the deformity. Schüller concisely explains the modus operandi as follows: "The abnormal development in height occurs thru the fact that the skull, prevented from growth in the sagittal direction in consequence of premature obliteration of the transverse sutures (coronary, lambdoid, and temporal), is compelled, with the help of the sutures running sagittally, to stretch out excessively upward, and in most cases also in breadth." Dock, however, states that the site of the suture closure varies as to its seat and degree, the sagittal suture being most frequently the primary site; next in frequency being the coronary. It is also stated in the ninth edition of Osler, that the deformity is due to premature synostosis of various sutures, notably the sagittal and coronary. A similar statement is also made by Groenouw, in the second edition of "Graefe-Saemisch Handbuch der Augenheilkunde" (1904).

Rieping reports an interesting case with autopsy on an infant girl at birth. The coronary suture was completely ossified and there was a bony ridge on the anterior half of the sagittal. There was no evidence of an inflammatory process. Hochsinger cites a typical case in a child

five weeks old with open sagittal and closed coronary sutures. Mehner in his report of twenty-one cases mentions the indistinctness of the coronary suture only, in all his cases, there being a definite ridge in several.

Whitnall in his text, "Anatomy of the Human Orbit," also states that the deformity is due to premature synostosis of the coronal and sagittal sutures. Even Schüller speaks of a skull he examined of unusual height in which there was only sagittal closure. He concluded, however, from a roentgenographic study of sixty-seven cases of tower skull that the deformity results from obliteration of the transverse sutures and fissures, the great height usually developing thru the open sagittal suture.

Certainly the primary site is not the sagittal suture, as shown by the majority of case reports which I have studied, tho occasionally this suture is found closed in tall heads. Virchow's explanation of the varying shapes of deformed heads is based on the fact that the skull cannot increase in size perpendicular to the course of the obliterated suture.

From a careful study of the skull classification by Schüller and by Virchow the deformity produced by obliteration of the sagittal suture would not be tower skull, but a narrow head, elongated anteroposteriorly, or a form of scaphocephaly. These have in some instances been confused with and reported as types of tower skull, tho properly speaking they are not. In fact, some of the earliest cases described were evident-

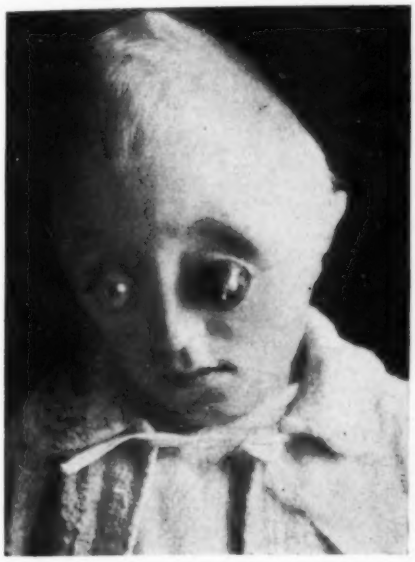

Fig. 1.

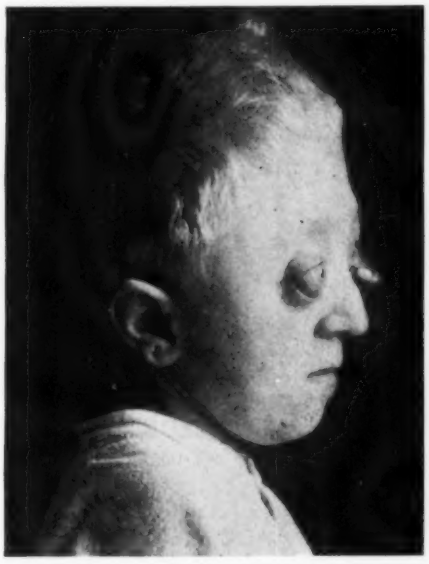

Fig. 2.

Fig. 1.—Case 1. Front view, showing left eye pushed out of an extremely shallow orbit.
Fig. 2.—Case 1. Lateral view showing the anteroposterior flattening of the tower skull.

ly of this type, and I believe that this is the basis for erroneous conclusions of subsequent authors.

ETIOLOGY. Admitting the premature closure of the transverse sutures uniting the occipital, parietal, and temporal bones, what is the cause of this synostosis? Many theories are advanced. The earlier writers, especially Bertolotti and Meltzer, rank rickets high as a cause, both stating eight-five per cent showed skeletal signs of this disease. Other observers, however, fail to confirm these observations, especially Fletcher, also Enselin, and Dorfman, (quoted by Sharpe). They consider some other underlying condition the etiologic factor, the nature of which remains obscure. The six cases reported herewith, as well as the case histories reviewed, fail to confirm the view that rickets is a possible cause, since in only three cases of the ninety-one were any signs of rickets

noted, and in some of these they were indefinite. Suture closure in rickets is usually delayed and not premature, and, furthermore, the cranial deformity differs. In my cases no signs of rickets could be found. There were also none in cases reported by Fletcher or Sharpe, nor in many of those quoted by the latter.

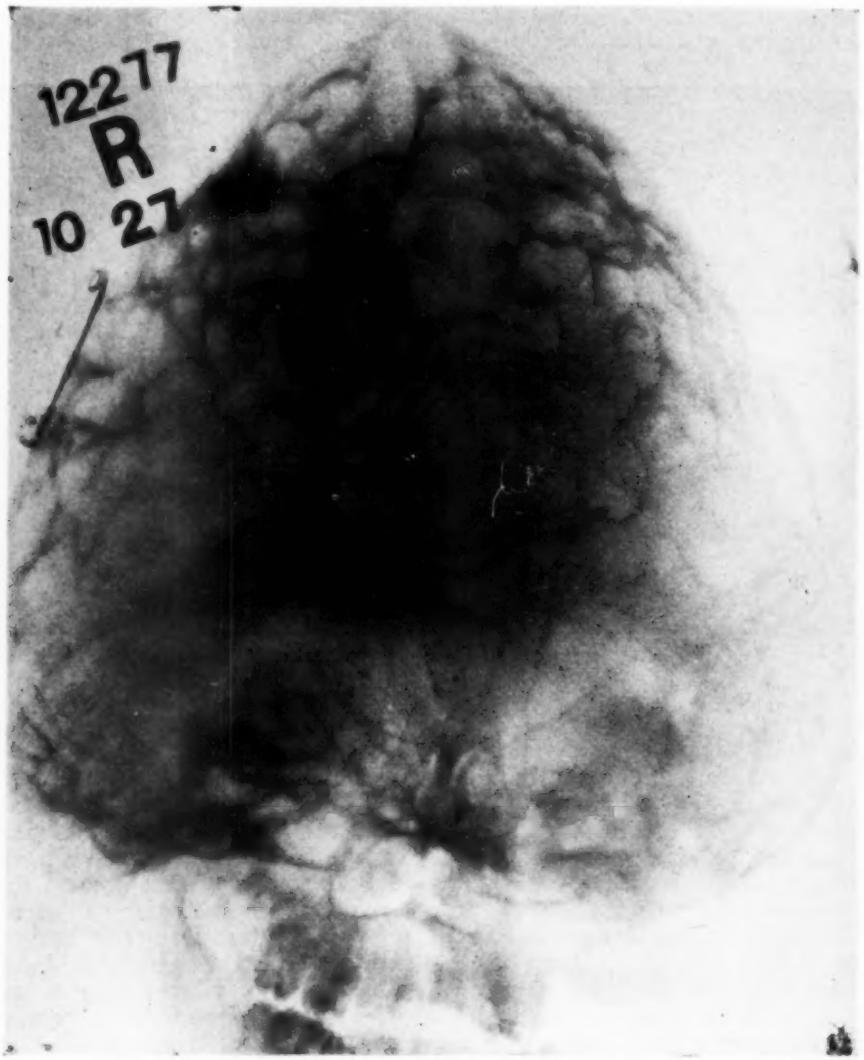

Fig. 3.—Case 1. Radiogram anteroposteriorly. Note lateral bulging in temporal region, cortex thin and exaggerated digital impressions thruout. No suture lines of base of skull recognizable.

Syphilis is mentioned by some authors, tho apparently conceded to be rare. Wassermann tests frequently have not been made. Blood Wassermann tests were negative in six cases herewith reported. Spinal fluid also was negative in the two cases in which it was examined. Negative Wassermanns are mentioned very seldom in the case reports reviewed, there being, however, no positive reports. Dock mentions the infrequency of data regarding syphilis, and states there is a "suspicious agreement that it is rare."

Meningitis, or meningeal irritation, has been advanced as a cause, to be discarded by most authors, tho Sharpe in his conclusions considers it the primary cause

of the deformity. There are, however, no residual cranial nerve or other palsies, nor is there any mental defect. Further, if meningitis is the causative factor, why are cases of meningitis in early infancy not followed by suture closure with this skull deformity resulting? Whitnall also states in his "Anatomy of the Human Orbit" that the malformation is due to meningitis. Surely one would not be justified in drawing these conclusions from a survey of the more recent case reports.

Prenatal osteitis is considered by some authors as the cause for the early fusion of the sutures, thru possible metastatic infection in utero, (Goldenberg). Increased nutrition is considered by Michel as a probable cause. New and excessive bone formations is mentioned by Watts, who bases his conclusions on results of findings in a case he decompressed, in which he found new bone formation two years later. He also states this new cortex showed the usual digital impressions upon X-ray. Fletch-

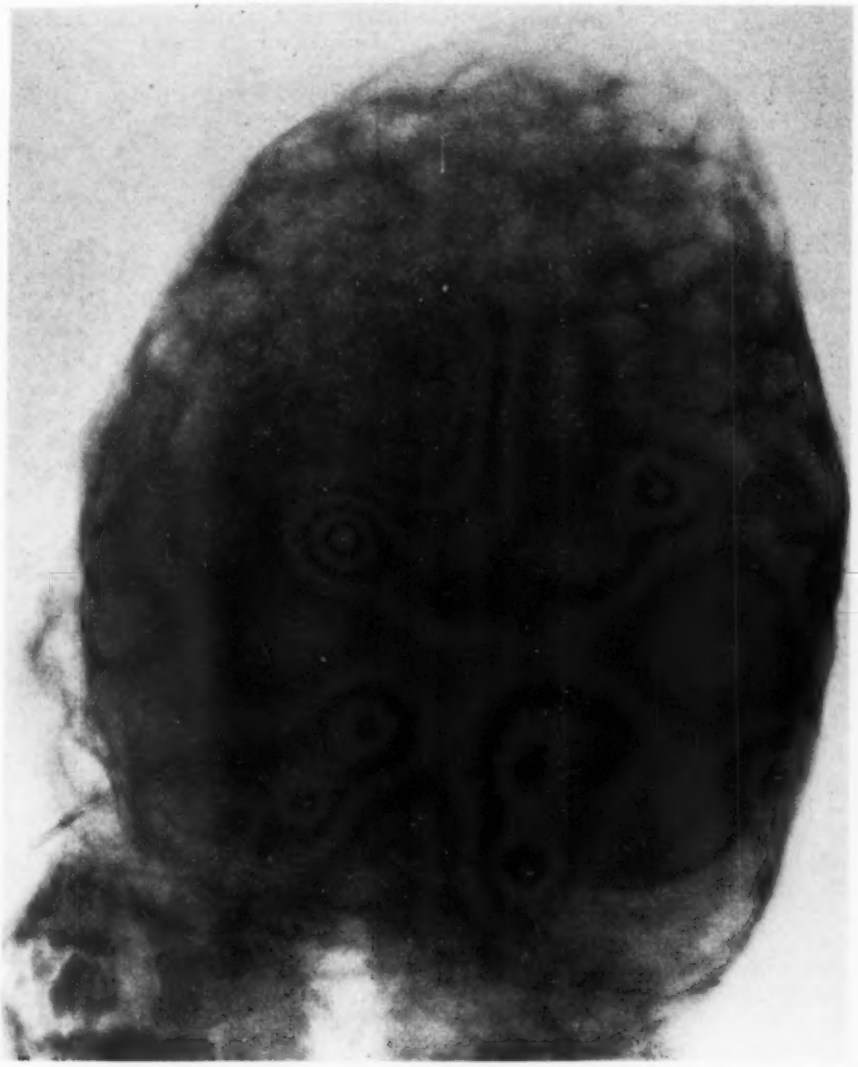

Fig. 4.—Case 1. Radiogram, lateral view. Orbits practically obliterated, sella flattened and displaced backward.

er suggests abnormal development of the pituitary body as evidenced by the X-ray changes in the sella. Patton mentions possible pituitary dysfunction and cites a case in a girl of three years who was very fat with a tendency to infantilism. Hydrocephalus is mentioned by some authors, but it is so unlike this disease it may be dismissed.

It seems to me none of these theories hold good in comparing the data of many recorded cases, including some post-mortem. The condition appears due most likely to some fault in development. I believe, as Stokes tersely states, "An abnormal twist in development or embryonal dysplasia" is most likely the cause of this anomaly, and he considers evidences of this "twist" may have been present in preceding generations in some other form, as tongue tying and bifid uvula. In other words, it is an ossification anomaly as pointed out by Schüller. This, I feel, is in a measure corroborated by the rather frequent presence of other congenital malformations, such as polydactylia, webbing of fingers and toes, dwarfism, cleft palate, tongue tie, bifid uvula, cleavage of vertebral column, congenital heart lesions, congenital herniae (especially umbilical), atresia of auditory canal, persistent medullated nerve fibers, faulty eruption and missing teeth and others. Such anomalies appear seventeen times in these case reviews, and at least one was present in four cases herewith reported in detail; namely, webbing of the fingers as shown in the photographs (Case 2), a slight hernia (Case 1), congenital paraplegia (Case 5), persistent medullated nerve fibers (Carl's).

No race is exempt.

Perhaps *heredity* plays a more important role in tower skull than is attributed to it by most authors. In the cases herein reviewed at least eight are definitely associated with an hereditary history, and in some fifteen cases there was a definite familial history. Savelli concludes that the condition is likely hereditary. A considerable number are found in negroes in whom the sagittal, lambdoid, and coronary sutures close early (Pomerol-Frederic).

The condition is more frequently found in males, in this series reviewed forty-one were in males and twenty-five in females. In twenty-six cases no sex was mentioned. Sharpe quotes the proportion as five to one. The disease may be more common in males due to the fact that in females there is a definite tendency to a somewhat slower and less complete suture closure, according to Frederic.

Symptoms and Physical Signs. The chief signs and symptoms of the disease might be enumerated in the following manner:

1. Impairment of vision due to optic atrophy.
2. Exophthalmos.
3. Strabismus.
4. Nystagmus.
5. Skull deformity.
6. Headache.
7. Convulsions.

1. *Impairment of Vision* varies from a mild amblyopia to complete amaurosis. The reduction in vision, however, is usually more marked in one eye than the other. It frequently advances to a certain point and thereafter may become stationary, there usually being no tendency to recover. Brav states that, usually, whatever vision is present after atrophy has reached its height, is preserved thruout life. The lowered vision is due to a secondary optic atrophy of varying degree. Cases have been observed in the earlier stages when a definite papillitis was present. The atrophy is most likely secondary to a choked disc, which in turn is probably the result of increased intracranial pressure.

Many authors incline to this view, and I believe there is ample proof that increased intracranial pressure is present at some time in most cases. Patients who have been trephined have proven this contention, and X-ray findings definitely indicate its presence. Skull growth apparently does not keep pace with the growing brain. Pieper, however, in his report of twelve cases does not indorse the view that increased intracranial pressure is an important factor in the production of optic atrophy. He appears to base his conclusions chiefly on the fact that one case was blind tho there was a bulging, pulsating mass at the bregma. It seems likely, however, that this spontaneous decompression may have oc-

curred after the optic nerves had become irreparably damaged by pressure. Thompson reports a case in a child of twelve months with typical skull deformity in which the vision appeared normal, but in which the anterior fontanella was open and bulging. Some authors, notably Michel and Ponfick, (Graefe-Saemisch) attribute the optic nerve inflammation to a narrowing of the optic foramen producing papillary stasis. This, however, has not been found in all cases coming to autopsy, as in one case here reviewed (Bedell).

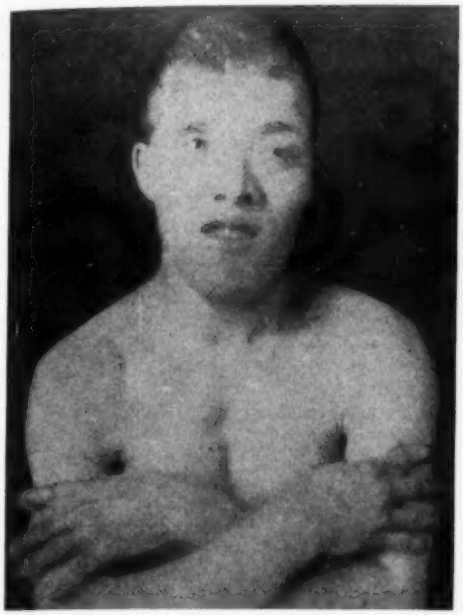

Fig. 5.—Case 2. Front view. Large features, head dome shaped, web between index and middle fingers on right hand.

Fig. 6.—Case 2. Lateral view. General attitude and expression, due to blindness from early childhood.

Whitnall states, "Of all cranial malformations, this one is most frequently associated with optic neuritis, due, however, not to intracranial pressure but to meningitis." Virchow also regards it as secondary to neuritis, the result of meningitis. Friedenwald, and also Fletcher, consider the nerve lesion due to direct pressure by the growing brain comparable to that of cerebral tumor. Dorfman also holds this view and considers that the brain becomes exposed to pressure as changes at the base advance.

I do not think sufficient importance has been attached to the possible stretching or kinking of the nerve, due to abnormal position of the canal and distortion of the base. I should incline to the view that optic nerve changes are a result of the combined influence of the increased intracranial pressure and the kinking or traction upon the optic nerve, produced by the abnormal position of the optic foramen and the distortion and depression of the base of the skull and its contained cerebral contents. Pressure or kinking of the olfactory tracts may also produce loss of the sense of smell. An illustration in the American Encyclopedia of Ophthalmology from a report of a case by Powers gives a good idea of the marked deformity of the base and the abnormal course of the optic nerve.

Other causes of reduced vision have been noted by observers; namely, congenital cataracts and choroidal changes; secondary corneal changes; ulceration followed by perforation; etc. Pupillary changes vary with the degree of amblyopia.

2. *Exophthalmos* is the most common physical sign observed in this disease, practically every case report mentioning it. Of these ninety-nine case histories only one is found in which this sign

is reported absent, (sixteen give no data). The exophthalmos varies, from the milder degree to extreme proptosis and practical extrusion of the globe. Frequently the lids cannot be closed. The lid symptoms of exophthalmic goitre are not seen. Ptosis is frequently seen. In one case herein reported, one eye was entirely outside the bony socket with complete eversion of the lids.

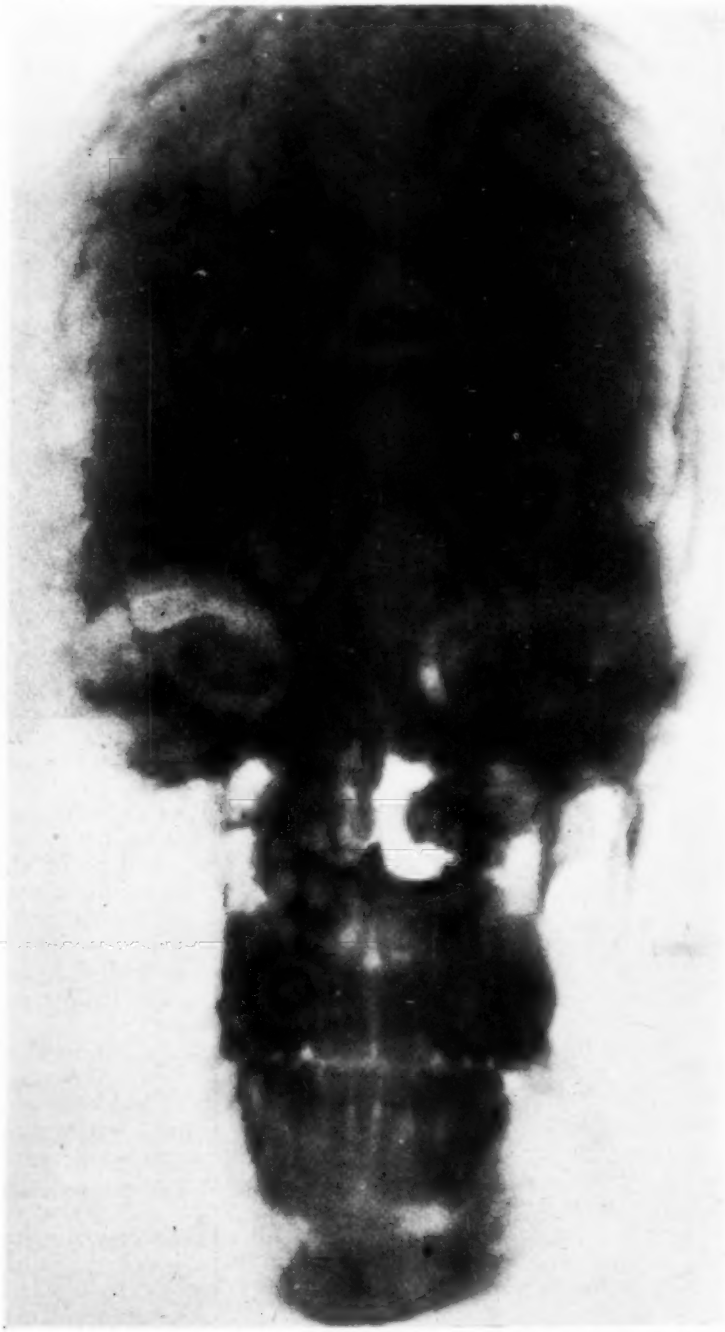

Fig. 7.—Case 2. Roentgenogram from the front. High dome shaped head; all sutures appear closed; sinuses well developed.

The exophthalmos is due to very shallow orbits, whereby there is insufficient room for the globe and the surrounding soft tissues. The orbit becomes saucer shaped, because of malposition of the various bones entering into its formation. The roof of the orbit becomes almost vertical due to the deepening of the anterior cranial fossa, which in turn is the result of pressure and crowding down of the growing frontal lobes. The lesser wing of the sphenoid assumes a vertical rather than horizontal plane, thereby also compressing or narrowing the optic foramen, which may also contribute to the pressure upon the optic nerve (both thru its narrowed lumen and abnormal position).

The orbit is shortened also by the bulging forward of the greater wing of the sphenoid which is produced by the expansion of the middle cranial fossa, so typical of the extreme type of tower skull, as shown by X-ray of the base of the skull. Weiss and Brugger state that the orbit was shortened by 10 mm. in several specimens which they studied, while Groenouw in Graefe-Semisch gives the following measurements in a specimen studied in the anatomic collection in Breslau:

Fig. 8.—Case 2. Radiogram, lateral view. Moderate grade tower skull; high, dome shaped head, shortened anteroposteriorly; digital impressions thruout; all sutures appear closed; suggestion of open sagittal; sinuses well developed, especially frontal; orbit shallow.

ORBIT, TOWER SKULL.

	Breadth	Height	Depth
O.D.	41	35	42
O.S.	40	37	41

NORMAL SKULL.

	Breadth	Height	Depth
O.D.	36	31	47
O.S.	37	31	46

In Case 1, herewith presented, in which the eye was enucleated, the entire orbit could be easily palpated. It was extremely shallow and saucer shaped, tho definite measurements could not be made.

3. *Strabismus* is frequently present in the form of a divergent squint, tho convergence is also seen. In the cases reviewed there were twenty-nine with divergence and three with convergence. No doubt the squint is the result of poor vision, the defect being more marked in the squinting eye. There is rarely any disturbance in the motility of the extra-ocular muscles except in extreme proptosis.

4. *Nystagmus* of the ocular type is also a fairly common sign, and undoubtedly has its origin in early amblyopia.

5. *Skull Deformity* varies from a merely tall head to the more typical findings below; namely:

(a) High dome shape or pointed skull; high forehead.
(b) Short antero-posterior diameter, (typical severe type).
(c) Widening or bulging temporal fossae, (typical severe type).
(d) Flattened cheek bones.
(e) Feebly marked superciliary ridges.
(f) Shallow orbits.
(g) Prognathism, (mild cases).
(h) High, narrow palatal arch.
(i) Deviation of nasal septum.
(j) Obliteration of sutures, thickenings or depressions.
(k) Crista Sagittalis—prominent ridge along anterior portion sagittal suture, (mentioned by many authors, not present in cases herewith reported).
(l) Asymmetry of face.
(m) X-ray findings are among the most interesting changes found and form one of the striking and important points in the diagnosis.

The more typical *radiographic findings* show thinning of the skull, together with depressions and ridges, or the so-called digital impressions. These are seen over a large portion of the cortex, often thruout. The skull appears honeycombed, the depressions conforming to the underlying convolutions. These depressions are attributed by most authors to the pressure of the underlying convolutions in a skull unable to expand due to suture closure. Vessel markings are exaggerated. The base of the skull also shows the result of this craniostenosis, as the middle fossa is often pushed down near the level of the posterior fossa and the anterior fossa is shortened and distorted. The frontal sinuses are obliterated in extreme cases. Obliteration of ethmoids has also been noted. The shallow orbits can be plainly seen. There may be a definite protrusion at the anterior fontanel and at times an actual break in the skull and protrusion of brain; a spontaneous decompression.

Suture obliteration is usually seen. The sella may be clearly outlined. It may be widened and displaced backward (Fletcher).

6. *Headache* is mentioned as a symptom some twenty-three times in the case histories studied and was a prominent symptom in two cases herewith reported in detail. The pain is described as extremely severe, at times frontal or occipital, and is rarely accompanied by vomiting. The headaches usually disappear about the age of eight.

No doubt headache may be overlooked due to the inability of the young child to describe its symptoms. The disappearance of headaches or brain symptoms after seven or eight may be explained by the interesting observation of Merkel, quoted by Schüller, who states that the enlargement of the brain usually ceases at seven and does not resume growth until puberty. If brain growth is resumed at this period of development, symptoms of pressure may reappear. This may explain the absence of headaches in some of my cases, an absence that might otherwise appear strange owing to the extreme malformation of the skull. The first symptoms of cranial stenosis, however, may not appear until later in life. Shannon recently reports a case, with autopsy, in a man, aged twenty-nine, who had only lately complained of headaches. The deformity was insignificant tho the autopsy confirmed the diagnosis of tower skull. No definite data, however, are given of the early medical history.

7. *Convulsions* are mentioned as one of the symptoms by most authors. In this review it is reported in only six

cases, including one of my own. Undoubtedly convulsions may develop as a result of the rapidly increasing intracranial pressure, but this apparently occurs rather infrequently.

Accessory sinus disease has been noted. It was present in one case herein reported (antrum).

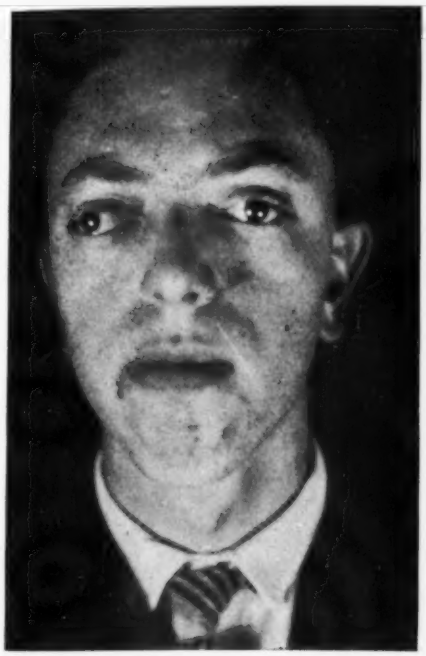

Fig. 9.—Case 3. Front view. Head moderately dome shaped, with prominence at bregma concealed by hair. Divergent squint. Bulging temples.

Fig. 10.—Case 3. Lateral view. Marked exophthalmos and prognathism.

COURSE. The condition is without doubt frequently present at birth, or appears in the early years of life. Very likely it has often been overlooked and therefore its onset attributed to a later date than its actual occurence. Fletcher attempts to classify the disease, with reference to its onset, as follows:

1. Deformity and exophthalmos present at birth.
2. Deformity and exophthalmos appear in early months of life and rapidly increase, with signs of poor vision.
3. Apparently normal for first few years of life, the earliest symptoms appearing from the second to the sixth year.

He considers the congenital cases comparatively few in number; with which view I cannot concur since some thirty cases in the reports reviewed were definitely congenital. This number must be much greater considering the difficulty often associated with the procuring of a reliable history.

Poor vision is usually noticed in the early years of life, altho fair acuity may be maintained up to six or seven years of age, or, in mild cases, to advanced years. As the child grows the skull deformity increases, and exophthalmos becomes more marked. The patients showing the severe type of deformity rarely reach maturity, while the milder forms are seen in patients of advanced years and in fact may go unnoticed. It is not accompanied by abnormal mentality. The patients as a rule are bright and intelligent, considering the deficient vision and limited opportunities.

TREATMENT. The treatment of this disease, so far, has consisted of efforts to avert blindness by early trepanation of the skull. The operation of subtemporal decompression has been advised and performed by a number of surgeons. Some very satisfactory results have been obtained, the headaches disappearing and failing vision being arrested. A rather large number of cases,

however, have had a fatal termination, at least within a very short period of time after the operation. Meningitis, pneumonia, and other complications are given as the cause of death. Schlofthe skull in a normal manner is prevented. Growth in the sagittal diameter is often prevented, whereby compensatory expansion takes place upward in the region of the anterior fontanel, as well

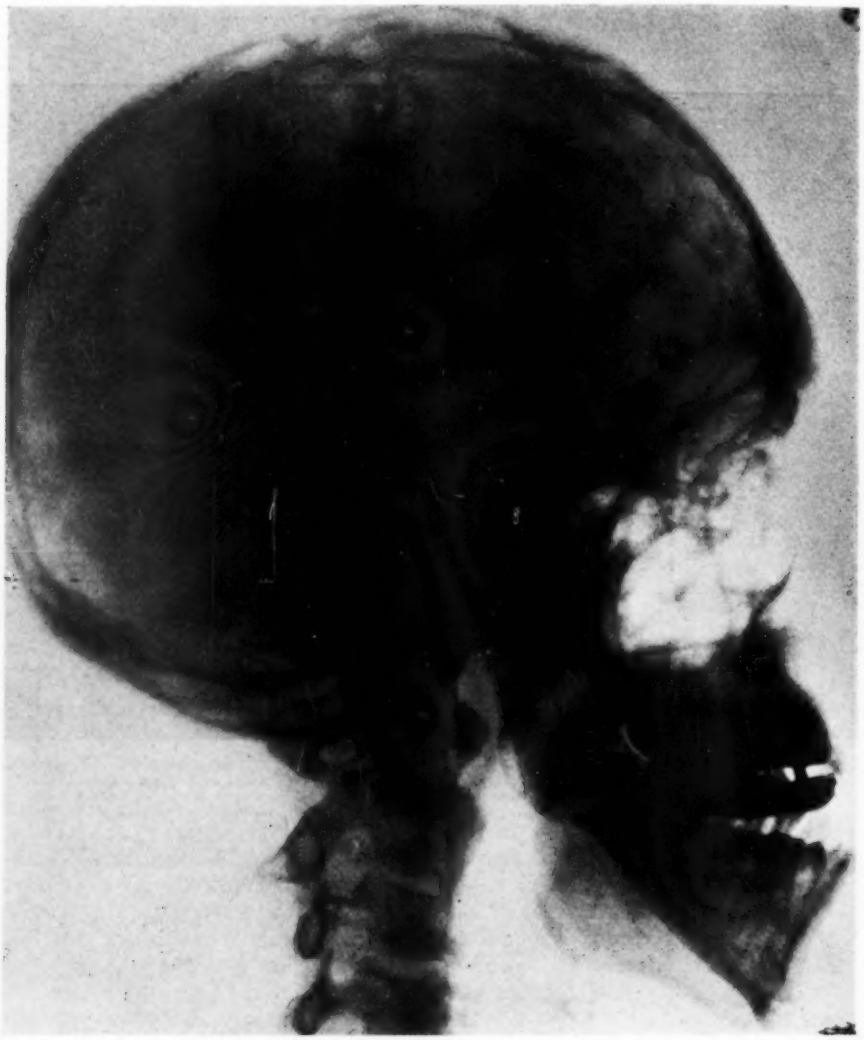

Fig. 11.—General contour of skull good; digital impressions, especially over frontal, temporal and occipital portions; cortex thin; sutures closed except sagittal, which appears open; bulging at bregma; slight prognathism; enlarged and deepened sella; shallow orbits; middle fossa slightly depressed.

fer, in two cases, removed a section of the optic canal. He reported slight improvement in vision in one case.

Conclusions. Tower skull (oxycephalus) is a congenital affection of the bones of the skull, probably the expression of a developmental anomaly. It is due to premature synostosis, or fusion of various sutures, whereby expansion of as downward and outward thru the depression of the middle, anterior, and temporal fossae. Partial obliteration of the orbits takes place resulting in exophthalmos. It is not associated with syphilis or rickets, and definite evidence of meningitis is lacking.

Defective vision of varying degree develops, due to optic atrophy, secondary

to a neuritis; which in turn is the result of intracranial pressure and distortion of the optic canal with traction on and kinking of the nerve.

Tower skull is probably more common than has been generally believed. Few diseases are accompanied by such a large variation of structural changes and physical signs. Great confusion has arisen in the description of this anomaly, due to the variety of names used by different authors, and to the improper classification of the varying types of skull deformities which result from premature synostosis. Of the many names which have been applied to this malformation, tower skull is perhaps the most accurately descriptive. No race, sex, or age is exempt, but the disease seems to appear more frequently in males and often in negroes.

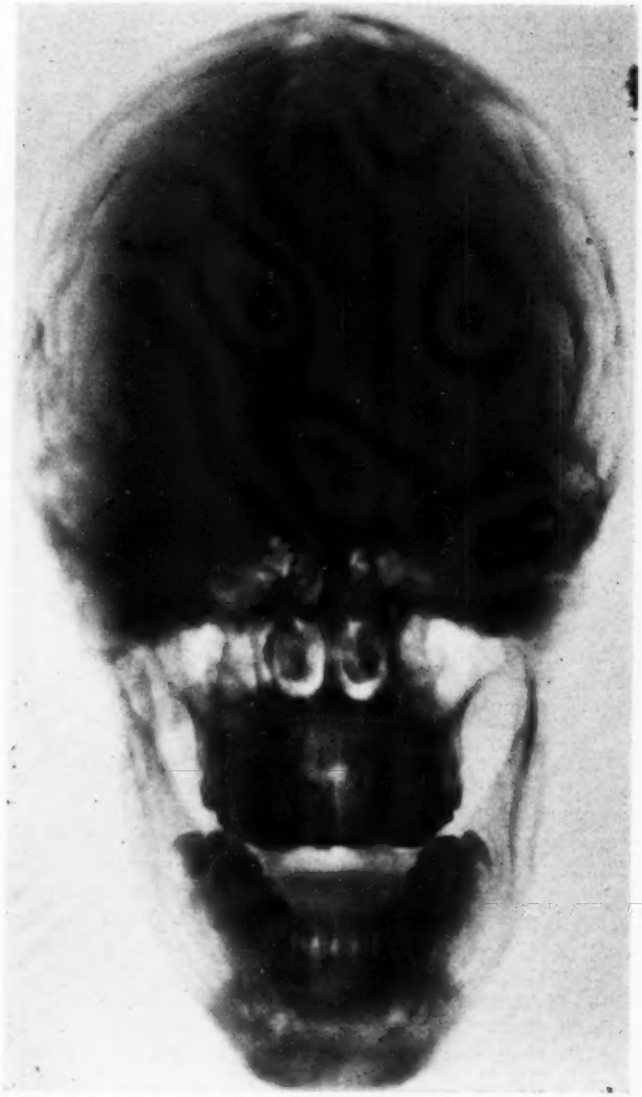

Fig. 12.—General contour of skull good; digital impressions, especially over frontal, temporal and occipital portions; cortex thin; sutures closed except sagittal, which appears open; bulging at bregma; slight prognathism; enlarged and deepened sella; shallow orbits; middle fossa slightly depressed.

SUGGESTIONS FOR STUDY. Careful family history. Careful early history. X-ray of bones of extremities. More

careful histologic study of bones involved may throw some light on the nature of the disease. Examination for other congenital anomalies together with examination of parents for similar defects. These minor congenital defects appear as precursors of the more grave defect, tower skull, in a later generation.

CASE REPORTS. TOWER SKULL.

CASE I. M. K., white, aged 12, born in U. S. A., admitted to University Hospital, 10/10/22.

Chief Complaint—Defective vision and protruding eyeballs.

Personal history—Fourth child of nine. Child was a normal, full term delivery, tho eyes were protruding and head misshapen, (cone shaped) at birth, the condition being called congenital by the county nurse. A breast-fed baby; began to talk at usual age but did not walk till age of four. There is no history of pain, headaches, or convulsions; no childhood diseases, other than present trouble. At age of three years the left eye became inflamed and has since that time become entirely blind. There has been a recurrent formation of a crust over the entire cornea, which becomes dislodged by pus periodically, to again gradually reform over a period of about two weeks.

Family history—Father and mother are living and well. There are four brothers and four sisters, living and well. There is no history of still births, epilepsy, insanity or paralysis.

Present illness—Began at birth, as stated, with marked skull deformity and prominent eyes; no marked impairment of vision was noted until age of three, when a secondary corneal infection developed in the left eye. This no doubt was an ulceration due to exposure of the cornea, with perforation. Following this the vision was entirely lost and poor vision was noticed in the right eye. The child has few or no complaints, aside from skull deformity and poor vision.

Physical examination—An under-developed boy of twelve years. Mentally the child does not appear below normal, for one handicapped with the loss of sight and lack of education. He replies readily to questions he understands.

Head—The skull presents an unusually high, pointed, tower shaped configuration. In its entirety it is lozenge shaped. The forehead rises precipitously to a high peak. The head is markedly flattened anteroposteriorly, there being an absence of the external occipital protuberance. The head is perfectly flat posteriorly from the neck to the extreme apex of the cone. There is a vertical groove in the skull in the region of the occiput, dividing that aspect into asymmetric halves, the left being more prominent. There is marked bilateral bulging or prominence in the temporal regions.

Cranial measurements—Horizontal circumference just above superciliary ridges, 52 cm.; nasion over top of head to region of external occipital protuberance 34 cm. (unsatisfactory due to absence of latter). From auricle to auricle (junction with scalp), 36.5. Both mastoids are larger than normal, with unusually deep premastoidal sulci. The hair is sparse and white, giving an albinotic appearance.

Face—Symmetric; skin is parchment white. The lips are red; mouth is kept open; adenoid expression; the malar regions are flat.

Eyes—Right eye, vision is 9/200; marked exophthalmos; ocular movements free in all directions except downward; the bulbar conjunctiva is injected, with slight mucopurulent discharge; the cornea is clear above, the lower one-half is hazy due to corneal nebulae which are mostly superficial. Normal measurements and a normal depth of the anterior chamber. There are a number of superficial opacities of the lower one-half of the cornea probably due to exposure and resultant ulceration. Pupil measures 5x5 mm. The iris is active to light and in accommodation. The eye appears to be pushed forward out of the socket. The external configuration of the margins of the orbit appears to be of normal outline, tho much flattened. The lids are closed with extreme difficulty; the tension is normal, 24 Schiötz.

Fundus—O. D.—With dilation of the pupil a fairly clear view is obtainable of the entire interior of the globe and background of the eye. The optic nerve shows definite atrophy, of a postneuritic type. The disc margins are distorted and white, patches of exudate extend out beyond

their margins from above and below. The vessels are tortuous, especially the veins, and the arteries appear narrowed. Media are clear, tho a perfect view is not obtainable, due to corneal nebulae.

Left eye—The left globe protrudes more than the right, protruding so much that the lids become completely everted.

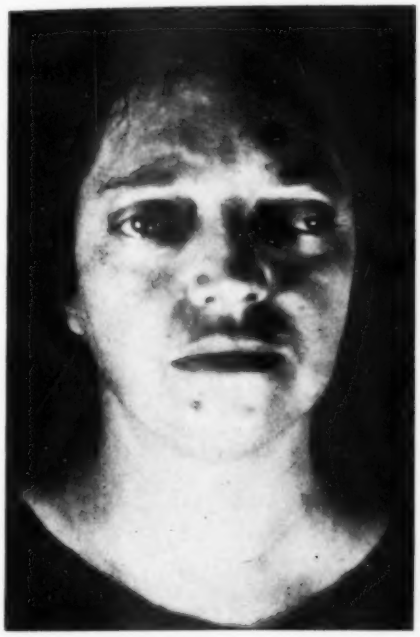

Fig. 13.—Case 4. Mother of Case 3. Front view. Divergent squint. Shape of head good, but bony prominence at bregma.

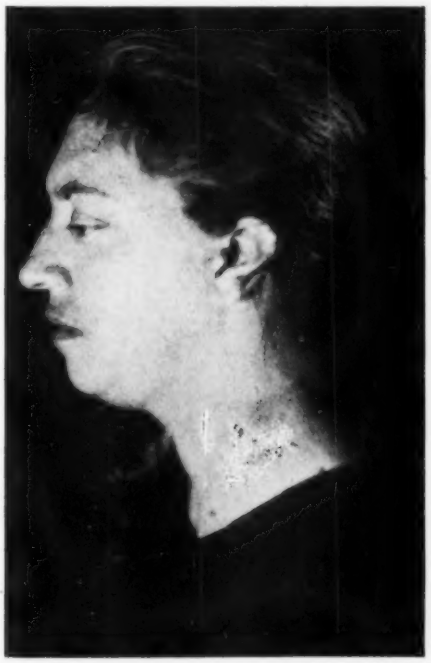

Fig. 14.—Case 4. Lateral view. Definite exophthalmos. Deformity of left auricle.

The bulbar and palpebral conjunctiva is engorged and covered by a desquamating scale. Under this the conjunctiva is extremely engorged and velvety. This exfoliating scale covers the entire globe and lids; and, with slight force, the crust can be completely dislodged as a cast of the eye and surrounding tissues. The outline of the cornea is but faintly seen thru the veil of roughened and vascularized corneal tissue. Ocular movements are fair in all directions, except downward, with slight limitation upward and mesially; no definite deviation could be determined.

Nose—Bridge is very flat. Deviation of nasal septum to right side; membranes congested.

Mouth is held open. Tonsils cryptic; pharynx appears normal; teeth in fair condition; tongue protrudes in midline.

Ears. Grossly normal shape. Hearing good.

Chest. Scaphoid sternum, symmetric; expansion fair, no evidence of rosary. Skin is covered in places with small raised pink dry areas, eczematoid in character; also on arms and upper abdomen. Lungs normal to percussion, fremitus, and auscultation.

Heart. Not enlarged. There is a systolic murmur heard best at the apex; second sound snappy, also heard at second interspace to left.

Abdomen. Protruding umbilicus with hernial tendency; liver and spleen not palpable; contour is moderate pot-belly.

Genitalia. The pelvic region resembles the female in type, particularly in the pubes, and a circular fold surrounds the genitalia which resembles the labia majores. Genitalia proper are normal.

Extremities. Configuration of hips and thighs are feminine. Entirely free from any evidence of rickets. No epiphyseal enlargements or thickenings of tibia. Musculature good. Patellar reflexes absent; biceps active; Babinski negative.

Neurologic examination. Shows reduced vision due to postneuritic atrophy; ocular movements fairly free; slight limitation due to extreme exophthalmos. Pupil slightly dilated; active to light and in accommodation. No nystagmus. Fifth and seventh nerve action apparently normal.

Hearing good, whispered voice at ten feet; bone conduction greater than air conduction; the latter somewhat increased. IX, X, XI, XII nerves normal. Patellar reflexes absent; Babinski negative; biceps active. No paralysis; no anesthesias; cerebrum and cerebellum normal. Blood pressure 104/60.

Laboratory findings. Urine examination, negative; blood, negative. Spinal fluid, Wassermann, negative; tension, almost a stream; cell count inhibited by blood; spinal fluid, negative (tr. to 1 c.c.) Gold sol. 0000000000; Ross-Jones and Noguchi negative. Blood Wassermann negative.

Fig. 15.—Mrs. J. B. Lateral view. General configuration of the skull good; digital impressions over frontal region; slight depression of middle fossa; sutures all closed; orbits shallow. Note deformity in son, (W. B., Case 3) is slightly more marked.

Six days after admission, under ether anesthesia, the left eye was enucleated; a purse string suture was applied to the conjunctiva, and the lids were stitched together. This was required because of the long standing everted position of the lids, together with the fact that there was still a protrusion of the orbital contents

thru the lids in spite of the absence of the globe. This, however, was finally overcome by pressure upon the closed, sutured lids whereby they finally assumed their normal position. Due to the prominence of the orbital contents, the appearance with the lids closed was practically that of a normal eye which had not been enucleated. Palpation of

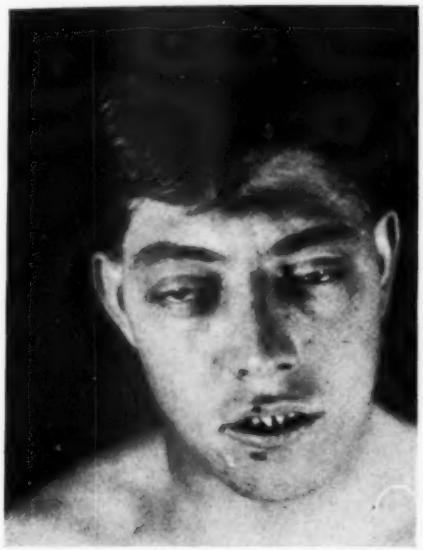

Fig. 16.—Case 5. Front view. Bony protrusion of bregma. Divergent strabismus; ptosis exaggerated in picture.

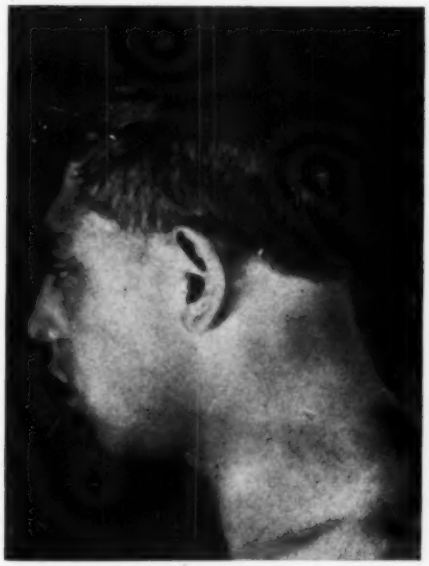

Fig. 17.—Case 5. Lateral view. Moderate exophthalmos. Forehead compressed.

bony orbit showed socket extremely shallow, almost saucer shaped.

X-ray examination—X-ray findings were among the most striking and interesting features of this case. Several views of same are herewith shown. The general configuration of the skull is high and pointed, very broad laterally with bulging of the temporal regions, with compression anteroposteriorly. The cortex is extremely thin and shows exaggerated digital impressions thruout. The base shows marked changes, the middle fossa being depressed to the same level as the posterior fossa. The anterior fossa is compressed. The orbits are practically obliterated, orbital margins being faintly marked. Frontal sinuses are present but small; antrums fair size. Some ethmoid cells are present, tho middle fossa appears to obliterate them partially. Sella appears flattened and displaced backwards, otherwise indefinite. Few mastoid cells demonstrable. No definite suture lines can be made out; they are all apparently obliterated.

Pathologic study of enucleated eye. Globe has normal shape and contour; cornea shows extensive changes in epithelium, consisting of a cornification of the superficial layers. The epithelium is keratinized and shows extensive finger like processes, which extend deep into the substance proper of the cornea. The latter shows widespread infiltration with lymphocytes. The lens is missing, apparently completely absorbed. The retina presents a fairly normal appearance. The optic nerve shows evidences of mild atrophic changes. The nerve as a whole is slightly smaller in size, when compared with the normal. The physiologic cup appears obliterated.

Case II—R. B., white, age twenty, single, American, first admitted to University Hospital, from State Institution for the Blind, on January 12, 1920.

Chief complaint. Blindness.

Personal history. Partial blindness since age of three, associated with attack of brain fever. Previous medical history reveals nothing but "brain fever" in childhood.

Social conditions, at home are very poor; education is very limited, being

confined to some occupational teaching at State School for the Blind.

Family history. Mother is feeble-minded; her head is abnormal in shape; her eyes are widely separated; her forehead is wide and flat; her nose is flat and

Fig. 18.—Case 5. Dome shaped skull, shortened antero-posteriorly; bulging at bregma; sutures, coronary and lambdoid closed, sagittal open; digital impressions thruout frontal and temporal portions; marked depression of middle fossa and shortening of anterior fossa; orbits shallow; sinuses well developed, especially frontal; moderate prognathism.

crooked. Father was killed in a railroad accident three years ago; he was shiftless and mentally deficient. There are six brothers and sisters, all mentally deficient.

Present illness. Blindness since the age of three, associated with an attack called "brain fever." No history of headaches of recent years.

Physical examination. Patient is a young man of about twenty years, undersized, but of splendid muscular development; he speaks with some speech defect and fullness of voice; jaws and features are large; the head is large, being definitely high, or dome shaped, tho symmetric. The forehead is high; fingers are nail bitten with a tendency to clubbing; legs are cyanotic and cold; pulse is full and bounding.

Head measurements. Nasion to external occipital protruberance is 34.29 cm. From auricle to auricle is 33.02 cm. Head circumference is 52.07 cm. From nasion to height of peak is 16.51 cm. There is a high palatal arch, with deflection of the nasal septum to the right side; there is an enlargement of the inferior turbinate with purulent nasal discharge. The teeth are in fair condition;

ears show the right drum to be atrophied, retracted, and dull gray in color; the left drum the same tho not so marked; hears the spoken voice at six inches with the right ear and at three feet with the left. Throat shows moderate sized tonsils.

Eyes. Show a definite exophthalmos; lids are slightly inflamed, especially the right, with some tearing from both eyes. There is a horizontal nystagmus to the right side; the external movements are limited, largely due to an inability to fix. There is a slight ptosis, and suggestion of divergence in the left eye. Vision in the right eye, light perception is fair; in the left eye, light perception only. The corneas are clear, except for several small faint nebulae near the center of the right eye. The pupils are dilated, measuring 8x8 mm.; the right pupil reacts

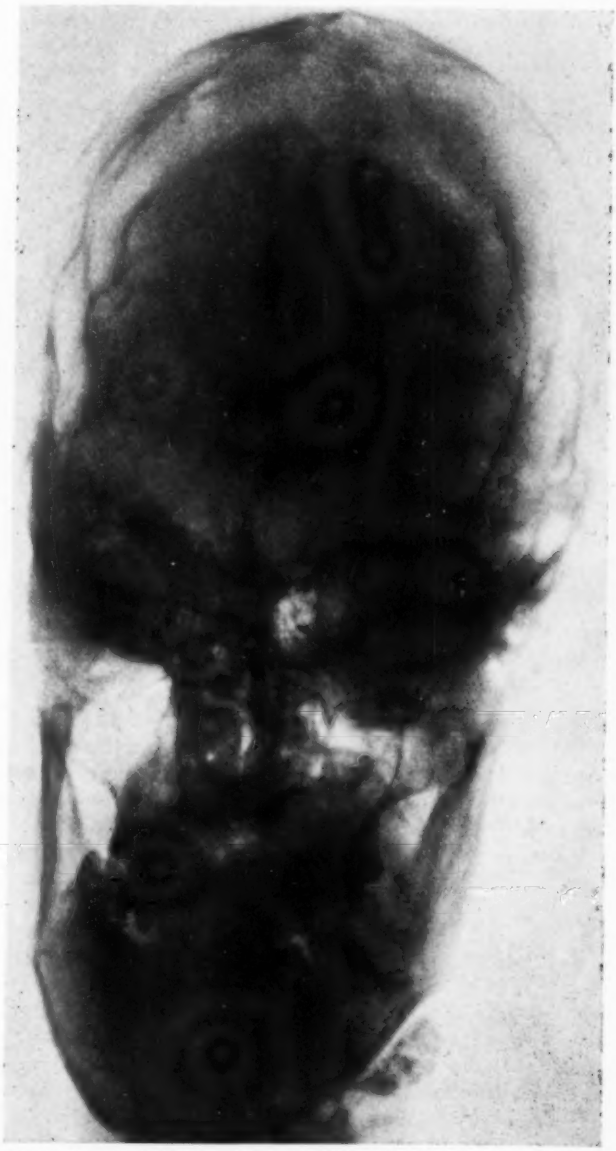

Fig. 19.—Case 5. Dome shaped skull, shortened antero-posteriorly; bulging at bregma; sutures, coronary and lambdoid closed, sagittal open; digital impressions thruout frontal and temporal portions; marked depression of middle fossa and shortening of anterior fossa; orbits shallow; sinuses well developed, especially frontal; moderate prognathism.

sluggishly to light, and the left does not react to light.

Fundus examination shows the media clear, with well marked optic atrophy of secondary type, in both eyes. The discs are white and oval with irregular margins. There is no cupping; the veins appear to be below normal size, especially the superior veins. The arteries are very narrow, those towards the periphery having lost their light streak. No definite lesions of the retina can be made out.

Blood Wassermann. Negative; spinal Wassermann, negative; trace to 1 c.c. negative. Gold sol. 0000000000. Ross-Jones negative. Noguchi negative.

Laboratory findings. Urine examination, and blood, negative.

Patient was readmitted 11/9/22 for further study and observation. No changes were observed. Additional X-rays of the skull were made which are herewith shown. At this time a *mental examination* was made by Dr. W. J. Bleckwenn of the Wisconsin Psychiatric Institute with the following report: "His mental condition cannot truly be called feeble-mindedness, because of his lack of training and education. It appears that the training he received at the School for the Blind at Janesville has been retained, for he has been able to earn a small pittance at caning chairs and doing carpet work, but apparently not sufficient to maintain himself."

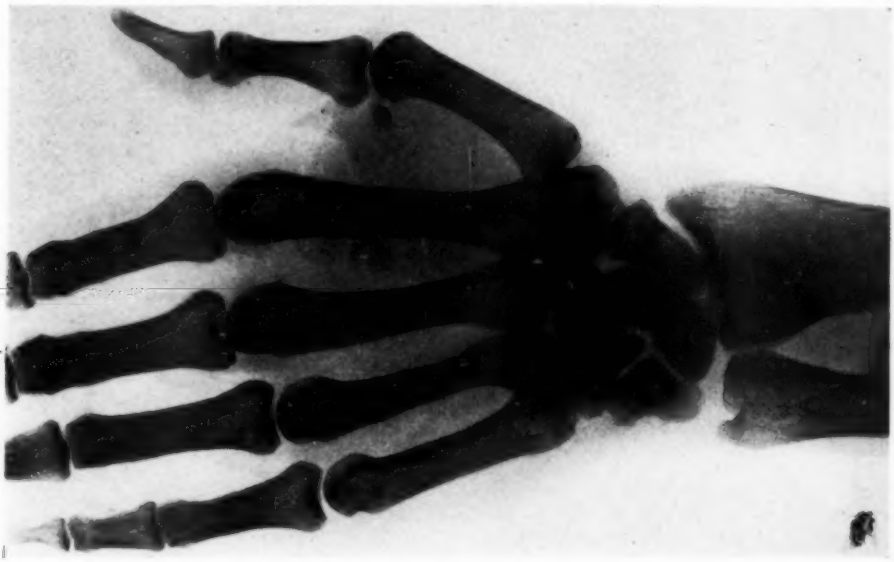

Fig. 20.—Case 5. Radiogram of hand and wrist, showing normal bones, complete absence of any sign of rickets.

Neck. Negative. Thyroid lobes not palpable.

Chest. Expansion good; breath sounds clear; no rales; no rachitic rosary; emphysematous in type. Apparent postural scoliosis with prominence of right chest anterior. Depressions above and below clavicles. Little respiratory movement at the apices.

Extremities. Reflexes markedly increased. No Kernig, ankle, or patellar clonus. Has web of two fingers. No umbilical hernia. There are no bony evidences of rickets.

Heart. Apparently within normal limits on percussion. Tones clear. P^2, A^2. No murmurs heard.

Lumbar puncture. No increase of tension.

X-ray findings. General shape of skull shows high dome shaped configuration with shortened anteroposterior diameter. The jaw shows marked prognathism. The cortex appears thinned in places; fairly well marked digital impression thruout. The traverse sutures appear closed. There is suggestion of open

sagittal in anterior portion. The orbits are more shallow than normal, tho not completely obliterated; sinuses, frontals large, ethmoids present, also antra tho the latter are somewhat compressed. Right antrum is hazy; the configuration of the base shows marked kyphosis, the basal angle being very acute. There is a depression of the posterior fossa and slight depression of the middle fossa. The lambdoid and coronal sutures are obliterated.

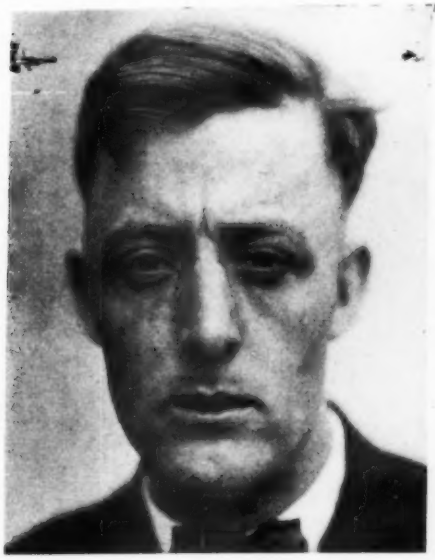

Fig. 21.—Front view. Head high, dome shaped. Frown of eyestrain.

CASE III—W. B., white, male, aged 17, born in U. S. A., admitted to Wisconsin General Hospital, 1/2/25.

Chief complaint. Obstructed breathing, poor vision.

Personal history. Patient was a full term infant, normal spontaneous delivery. Mother does not know when fontanelles closed but noted shortly after birth a marked prominence at bregma, nothing else abnormal was noted. Patient had measles and pertussis in childhood; no history of other illness.

Family history. Father, mother, one brother and two sisters living. Mother and one sister show moderate grade of tower skull, both having tall heads, with exophthalmos and divergent squint. Mother shows deformity of left auricle. Patient has one aunt and one uncle showing similar skull deformity, as well as one great aunt. All have prominent bulging at bregma, with exophthalmos and high narrow palates. Mental condition of all is said to be normal.

Present illness. Patient has no special complaint aside from obstructed breathing which has existed all his life. He has a protrusion of his eyeballs and poor vision which have been present since early childhood.

Physical examination. Well nourished male aged 18, white, rational, and apparently of normal mentality.

Fig. 22.—Case 6. Exophthalmos. Bulging bregma.

Head. General shape of head is good. It shows on close inspection a moderately high dome shape. The forehead is high and sloping, extending upwards to protuberance at bregma (concealed by hair), which is definitely palpable as a hard bony mass. Superciliary ridges well formed. No bulging of temples and no definite compression antero-posteriorly. No ridges along sagittal suture.

Cranial measurements. Root of nose to occipital protuberance, 13½ inches. Frontal occipital, 21½ inches. Mental occipital, 25½ inches. Frontal suboccipital, 21 inches. Mental suboccipital, 24 inches. Bregmatic suboccipital, 20 inches. External auditory meatus to external auditory meatus, thru bregma, 13¾ inches.

Face. Symmetric, prominent mouth, prognathism, flat cheek bones.

Eyes. Marked exophthalmos with divergent squint of 35 degrees of right eye. Right eye is more prominent. Ocular movements free in all directions. No paralysis. No nystagmus except on extreme rotation to either side. Pupils are a similar condition; pallor of disc is not so marked.

Nose. Externally normal; marked deviation of nasal septum practically occluding left nares below with high deviation to right side.

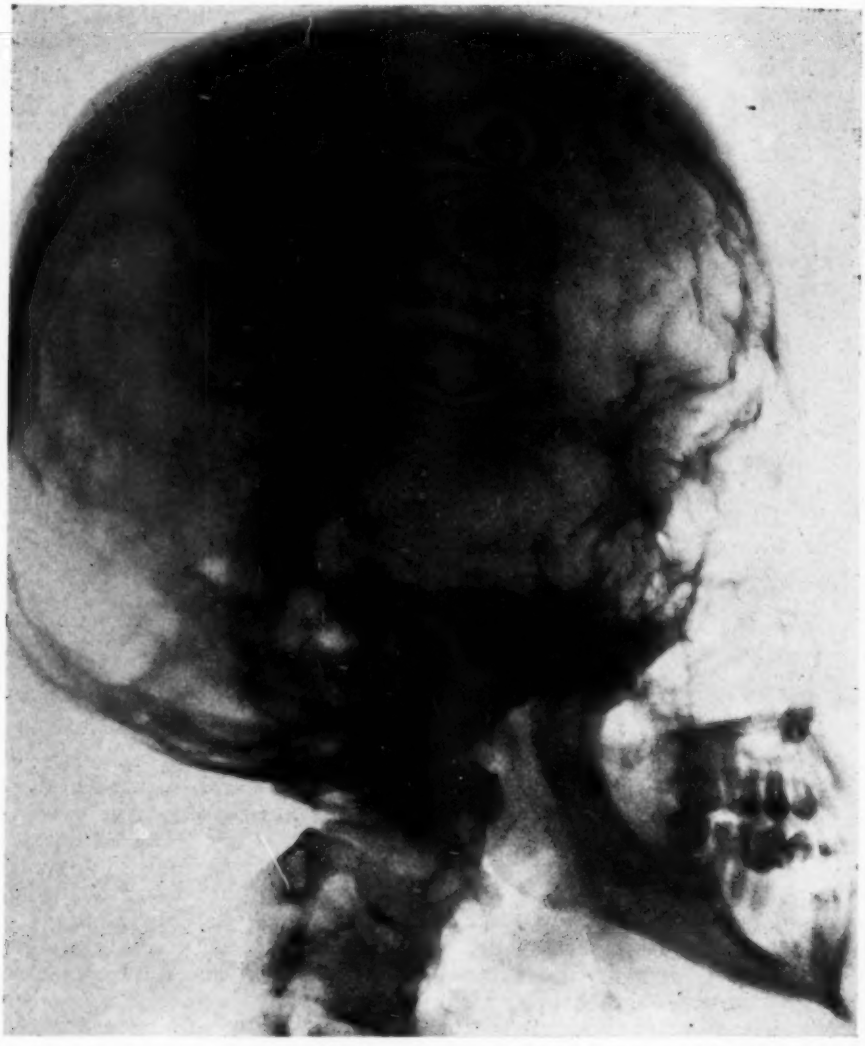

Fig. 23.—Case 6. Lateral radiogram. Thinning of cortex, digital impressions, slight bulging of bregma. Sella well marked, orbits slightly shallow.

equal, 5 mm. and react to light and in accommodation.

Vision. R., counts fingers at 3 feet; L., 20/40 to 20/30.

Fundus. R., shows well marked atrophy of optic nerve, the disc showing definite pallor, with irregular margins; no changes in retina observed. L., shows

Mouth. Lips protruding and thick. Teeth are set close together; incisors are set on an angle of 90 degrees to their normal position; the palate is very high and narrow, giving the impression of a cleft palate; tongue broad and flat; tonsils small; pharynx negative.

Ears. Normal; hearing acute.

Neck. Symmetric; no lymphatic adenopathy; no thyroid enlargement; there is a forceful pulsation over both carotids.

Thorax. Normally developed; no evidence of rosary; heart and lungs negative.

Abdomen. Negative; liver, spleen and kidneys are not palpable.

Genitalia. Normally developed; external inguinal rings normal in size.

Extremities. Normal; no enlargement of joints or other evidence of rickets; no polydactylism.

Fig. 24.—Case 6. Antero-posterior radiogram. Base of skull shows no marked abnormality. Sinuses fairly well developed.

Central nervous system. Biceps, triceps, knee jerks and ankle jerks normal; no pathologic toe signs. Cerebrum normal.

X-ray findings. General contour of skull is good. There is, however, a definite bulging and thinning of the cortex in the region of the bregma. Cortex in frontal region is somewhat thinner than normal, of about normal thickness elsewhere. Digital impressions are seen thruout the skull, tho much more marked in the frontal region. Sutures appear obliterated for the most part, tho there is suggestion of partial open upper sagittal. Grooves for the lateral sinus and meningeal vessels are well marked. Basal fossae show no striking abnormalities; floor of the anterior fossa is slightly depressed and the orbits consequently somewhat more shallow than normal. Sella is somewhat enlarged and deeper than is usually seen. There is practically a complete absence of the frontal sinuses, there being only a small cell extending up from the ethmoid. The ethmoids appear clear and widened, encroaching upon the orbits. Antra of normal size.

Blood Wassermann. Negative.

Blood and urine. Negative.

CASE IV. Mrs. J. B. Mother of Case III. Patient not admitted to hospital. White, adult, female, aged 50. Patient has had prominent eyes since a young child, with divergent squint and defective vision in one eye (squinting). There has always been a definite bulging bony prominence on top of her head. One brother and sister and one aunt have similar deformity and prominent eyes. Patient has two sons and two daughters living. One son and one daughter show similar deformity (daughter has not been examined).

Physical examination. The shape of the patient's head is good and would attract but little notice without careful inspection. The forehead is high, and rises to a moderate dome with definite bony prominence to inspection and palpation at site of bregma. The contour of the head is otherwise good. The superciliary ridges are well formed.

Face. Is broad, the eyes being wide apart. There is definite exophthalmos with divergent squint in the left eye of 30 degrees. Fundus shows secondary atrophy of the nervehead with some pallor of right. The left ear shows a congenital malformation of the auricle.

Cranial measurements. Root of nose to occipital protuberance 12 inches Frontal occipital 21 inches. Frontal suboccipital 21 inches. Bregmatic suboccipital 20½ inches. Mental occipital 23¾ inches. Mental suboccipital 21 inches. External auditory meatus to external auditory meatus, thin bregma, 13½ inches.

(Further data to be reported later.)

X-ray findings. General contour of the skull is good; shape similar to that of son reported above, tho none of the changes are so marked. The cortex appears about normal in thickness, except in region of bregma where it is thin and uneven. There are digital markings on the inner surface of the cortex thruout, tho but faintly seen in occipital region and fairly well marked in the frontal portion of the skull. Some of the grooves for the meningeal vessels are well shown, especially in the anterior half. All sutures appear closed. The sinuses are fairly well developed. The mastoid is prominent and pneumatic. The base of the skull appears fairly normal. The middle fossa is slightly depressed and the orbit somewhat shallower than normal. Sella enlarged.

CASE V. W. V. S. White, male, age 21, born U. S. A., admitted to Wisconsin General Hospital, December 29, 1924.

(Information obtained from patient.)

Chief complaint. Difficulty in walking.

Personal history. Patient has been told he was a normal baby and developed normally up to age when he should have walked, when it was found he made no attempt to stand. He was a sickly child and suffered from frequent headaches. He had whooping cough as a baby also mumps and measles. He had scarlet fever and diphtheria at 8 or 9; chicken pox at 9 or 10; no injuries. Patient is bright and intelligent, is in second year of high school, has sold papers on street.

Family history. Father and mother living and well; sisters, one living and well, aged 13; three died in infancy, one

of scarlet fever, one of pneumonia and one unknown. Brothers, one living and well, aged 23. No deformities in family so far as patient knows.

Present illness. Patient has never been able to walk; no attempt was made to walk until age of 9, when he was taught to move about with aid of crutches.

Physical examination. Adult male of 21 in no apparent pain or distress. He walks with the aid of two crutches with a markedly spastic gait. He is alert and apparently normal mentally.

Head. Configuration of head is definitely that of high dome shaped tower skull. Forehead shows marked bulging above superciliary ridges, due to unusually prominent and large frontal sinuses. Above this prominence the forehead recedes and appears compressed rising to a high dome. There is a definite bony protrusion at the bregma. External occipital protuberance is palpable tho the head is compressed and somewhat flattened above this point. There is no ridge along the site of the sagittal suture or other sutures. Head is somewhat compressed bitemporally.

Cranial measurements. Frontal occipital is 50 cm. Frontal suboccipital is 49½ cm. Mental occipital is 67 cm. Mental suboccipital is 58½ cm. Superciliary ridge to occipital prominence is 33½ cm. External auditory meatus to opposite external auditory meatus thru bregma is 37 cm.

Face. Fairly symmetric; receding chin, prominent nose.

Eyes. Definite exophthalmos of moderate degree is present with a divergent squint of about 15 degrees, right eye. There is an absence of any of the classical signs of exophthalmic goitre. (Photograph exaggerates and gives appearance of ptosis.) There is a slight lateral nystagmus on extreme rotation outward. Ocular movements free in all fields. Pupils are equal, 4x4 mm., react to light and are active in accommodation. Vision. R. 20/40—2; L. 20/40.

Fundus. Media clear, both discs show marked pallor presenting definite atrophy; disc margins are irregular; vessels normal; no retinal lesions.

Nose. Marked deviation of septum.

Mouth. Arch of palate high and narrow. Teeth. Incisors are misshapen, the front of the teeth are directed laterally.

Ears. Large; normal in appearance; hearing good.

Neck. Anterior cervical glands palpable; neck thick and muscular; thyroid shows general enlargement.

Chest. Heart and lungs negative.

Abdomen. Negative.

Genitalia. Normal.

Spine and extremities. Patient has a total kyphosis with spastic paraplegia. Trunk and upper extremities well developed; walks with the quadruped method with a scissors gait; marked adductor spasm on right leg and moderate on left; no voluntary effort can straighten right leg. There is a flexion deformity at hips and knees and feet are in marked equinus; moderate varus. Condition is considered by various attending physicians as a spastic paraplegia, spinal in origin. It probably bears no relation to the skull deformity.

Reflexes. Intention tremor both hands; finger to nose test a coarse tremor of hand but nose is correctly touched. There is moderate adiadokokinesis; knee jerks are moderately exaggerated; triceps jerks are markedly exaggerated; Babinski on both sides; ankle jerk on left but not on right.

X-ray findings. Skull is dome shaped, shortened antero-posteriorly, cortex appears of about normal thickness with the exception of the frontal region where it is definitely thinner than normal and covered with depressions and ridges—the so called digital impressions. There is a definite bony protrusion at the site of the bregma. Base of the skull shows typical changes in anterior and middle fossae; floor of former approaches vertical plane and the latter is depressed almost to the level of the posterior fossa. The coronary and lambdoid fissures appear obliterated, tho the antero-posterior view show some signs of an open sagittal suture. The groove for the lateral sinus is well marked as well as the grooves which lodge the meningeal vessels. The orbits are much more shallow than normal; sella is depressed but not enlarged; paranasal sinuses are well developed, especially the frontals which are unusually prominent. Shadow under

inner side of left lower maxilla is a calcified submaxillary lymph node. There is a moderate prognathism.

X-ray of hand and lower forearm. Shows complete absence of enlargement of any of the epiphyses as shown in the accompanying X-ray of the hand. This photograph is submitted as evidence of the absence of signs of rickets in these cases. In no case so far examined by

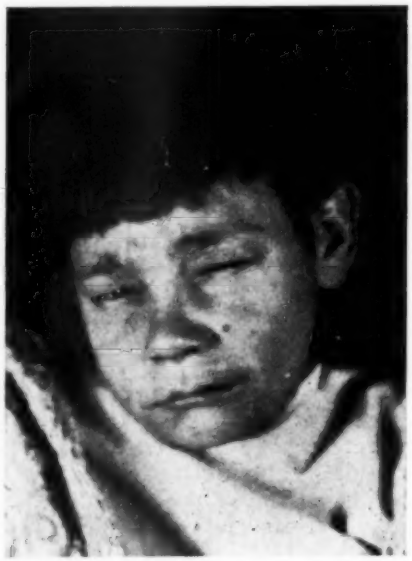

Fig. 25.—Case of congenital idiocy. Dome shaped tower skull but sutures remain open. No exophthalmos.

the author has there been any evidence whatsoever of bone or joint changes characteristic of rickets.

Wassermann. Negative.

Blood and urine. Negative.

CASE VI. P. L. White, aged 21, consulted me privately March 2, 1925.

Chief complaint. Defective vision.

Personal history. Patient is one of ten children. He states he suffered severe headaches as a child. No childhood diseases other than present trouble.

Family history. Ten brothers and sisters, one of whom is a twin brother, all living and well. Patient states twin brother has a slight degree of exophthalmos (brother not examined).

Present illness. Defective vision due to high degree of hyperopic astigmatism. Correction of refractive error has eliminated the headaches which have recently caused him difficulty. No other complaints.

Physical examination. Patient is young man of normal size and development. His head is definitely high or dome shaped, tho symmetric. The forehead is high. He is of apparently normal mentality.

Eyes. Show definite exophthalmos with well marked secondary optic atrophy of both discs. The left eye presents a definite anomaly in the way of persistent medullated nerve fibers.

Vision. R.=20/200, c. c. 20/50+2; L. 20/200, c. c. 20/30.

Nose. Externally normal, definite deviation of septum.

Mouth. Extremely high palate. Uvula has been surgically removed. Teeth poorly formed and has only twelve on upper jaw; the lateral incisors and third molars are missing. (Congenital anomaly).

Chest. No rachitic rosary.

Extremities. No enlargement of epiphyses.

X-ray findings. High, dome shaped skull; thinning of cortex; digital impressions thruout the skull; general configuration is good; slight bulging at the bregma; base of skull shows no marked abnormality. The coronary suture is closed; the lambdoids are partly open, (this latter has probably allowed for expansion of skull in occipital region); sagittal suture is open; sella is well marked; slight depression of middle fossa; orbits slightly shallow; sinuses fairly well developed.

Blood Wassermann. Negative.

CONGENITAL IDIOCY RESEMBLING TOWER SKULL. PRESENTED FOR CONTRAST IN DIAGNOSIS.

H. G. White, male, age 15, born in U. S. A., admitted to Wisconsin General Hospital December 26, 1924.

Chief complaint. Inability to walk since birth.

Personal history. History unsatisfactory, due to mentality of patient and absence of any relatives. Physician's report states patient has had congenital spina bifida cervicalis for which an operation was performed at Kenosha. Prior to this he had suffered with severe headaches. He has been unable to walk or stand since birth. Patient states he is always hungry. Had measles at 13; whooping cough and diphtheria.

Family history. Mother and father living and well (not in city); brother aged 8, sister 11, both subnormal mentally; sister aged three died of convulsions.

Present illness. Patient has no complaint aside from inability to walk. He is definitely deficient mentally, tho not entirely imbecile.

Physical examination. Patient is a

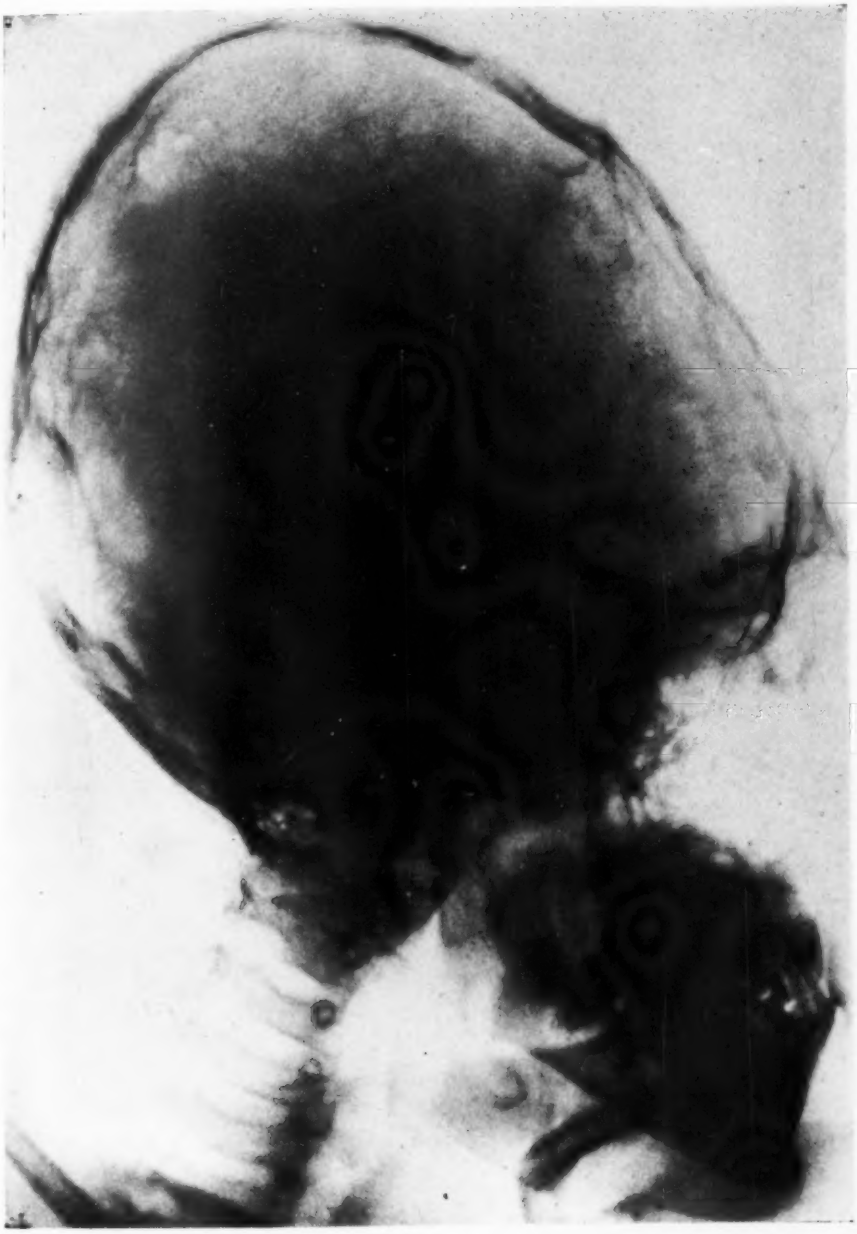

Fig. 26.—Case of Congenital Idiocy. Antero-posterior radiogram. Note tower shaped appearance of skull, apex of which is far back of that of usual site of in tower skull. Note open lambdoid and coronary sutures as well as sagittal; configuration at base does not show depressions of anterior and middle fossae; skull appears depressed in upper portion in anterior and posterior directions; sella normal in appearance; sinuses well developed. Note absence of digital impressions.

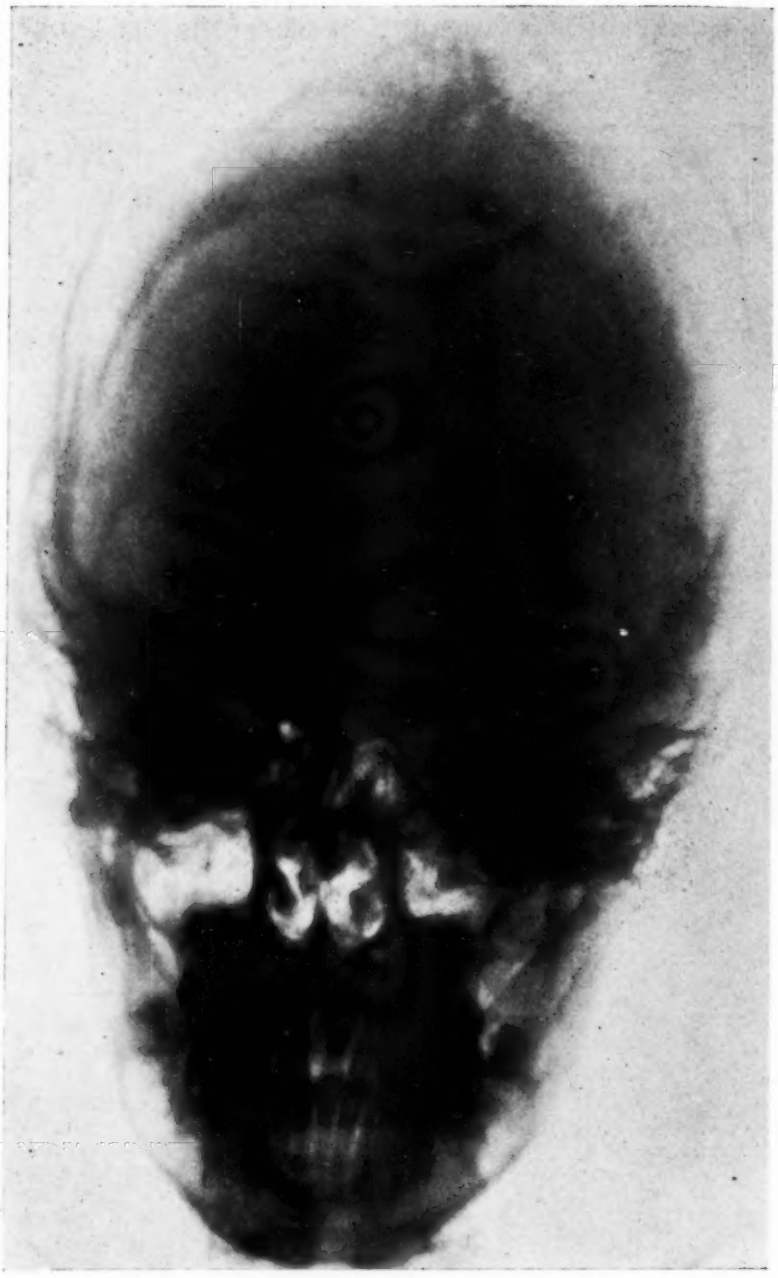

Fig. 27.—Case of Congenital Idiocy. Lateral radiogram. Note tower shaped appearance of skull apex of which is far back of that of usual site of in tower skull. Note open lambdoid and coronary sutures as well as sagittal; configuration at base does not show depressions of anterior and middle fossae; skull appears depressed in upper portion in anterior and posterior directions; sella normal in appearance; sinuses well developed. Note absence of digital impressions.

young, somewhat adipose, imbecilic appearing male, who is not actuely ill; unable to stand or walk, but cooperates fairly well, with fair degree of intelligence.

Head. Configuration presents definitely dome shaped tower skull, the apex of the dome being near occiput. The forehead is low and the skull appears compressed and elongated backward and upward, differing from typical tower skull in that the peak is not in region of bregma but displaced farther backward. Superciliary ridges are promient; site of external occipital protuberance is flattened; and merges with a soft protruding mass at site of former encephalocele; mass is four inches long, is soft, elastic and pulsates synchronously with the arteries; gives impulses on coughing and can be compressed, it is not tender or inflamed. There is no ridge along the sagittal suture.

Face is broad. Nose, bridge depressed; deviation of nasal septum; high palatal arch. Teeth, fair.

Eyes. There is a slight slanting of palpebral fissure, there being a suggestion of "almond shape" and slight epicanthus. Eyes widely separated; no exophthalmos is present; there is a vertical and horizontal nystagmus, spontaneous in both eyes. There is a slight convergent squint, the left eye converging about five degrees. There is apparently some weakness of both external recti muscles, as excursions are not free when looking out. Globes appear normal; pupils are round, equal, and react to light and in accommodation.

Fundus. Media are clear; there is a definite pallor of both optic discs, more marked in left eye. The retina of the right eye (lower half) presents a stippled appearance, probably due to variation in choroidal pigment. Arteries slightly narrow; vision cannot be obtained due to low mentality of patient, but appears to be fair.

Ears. Grossly normal; hearing acute.

Mouth. Teeth carious; tongue, tonsils, palate and pharynx negative.

Neck. Short, symmetric, no adenopathy; thyroid negative.

Thorax. Rounded posteriorly; symmetric; no deformity.

Heart and lungs. Negative.

Abdomen. Symmetric; large amount subcutaneous fat lies in folds, no masses; no enlargement of liver or spleen.

Genitalia. Somewhat infantile in type; both testicles present.

Extremities. Patient can stand with assistance; station is poor; extremities are rather infantile in appearance; texture of skin is fine; contour of legs and arms resembles that of a woman. There is ankle clonus; not sustained, ankle jerks active; Babinski negative.

Laboratory report. Wassermann, negative; blood and urine, negative.

Differential diagnosis. This case history is reported with accompanying X-rays and photographs for purpose of contrast in diagnosis.

The diagnosis of tower skull had been made in this instance, due to the definite dome or tower shaped deformity of the head. Careful study, however, definitely eliminates it from this classification, there being a striking absence of two of the cardinal symptoms or signs; namely, exophthalmos and evidence of suture closure upon X-ray.

X-ray. Careful study of the X-ray films discloses interesting variations from our typical turmschädel findings. *First,* the point of the dome is far back in the region of the occiput. *Second,* there is a striking absence of typical digital impressions, tho there appear to be eroded areas or a mottled appearance in some portions of the cortex. The cortex generally is thick. *Third,* the sutures, lambdoid, coronary and sagittal are definitely open. *Fourth,* the contour of the base also does not conform to the tower skull type. The anterior fossa shows a normal base and there is likewise an absence of the shallow orbit. This latter condition accounts for the absence of exophthalmos. Sella is wide. Sinuses are well formed as is the mastoid.

This case no doubt represents some form of idiocy of Mongoloid type. It will be recalled that the mentality of the patient with tower skull is not subnormal.

OXYCEPHALY WITH OCULAR COMPLICATIONS.

MACY L. LERNER, M. D. M. Sc. MED.

ROCHESTER, N. Y.

In the case here reported vision was lost after an attack of pertussis at the age of five years, accompanied by convulsions. There was atrophy of both optic nerves and characteristic deformity of the skull. The previously reported characteristics of this condition are reviewed.

Many types of deformity of the skull have been described, almost all of them resulting from premature synostosis of one or another suture of the cranial bones. From a clinical standpoint three fundamental types of skull deformity are differentiated.

(1). Turricephaly (turret head) which is short, broad and has an abnormally high skull.

(2). Scaphocephaly (scaphoid head) which is the name of the abnormally long and narrow skull.

(3). Plagiocephaly (slanting head) which is the name given the skulls with asymmetric synostosis.

Such deformities of the skull, while primarily an anatomic condition, should claim the attention of the ophthalmologist by reason of the diseases of the ocular structures usually present in these cranial affections.

No definite etiology has yet been established for craniostenosis; and therefore the report of an additional case, to the many already in literature, is justified.

CASE REPORT.

F. R., male, aged 42, single, occupation, piano tuner.

Family History: Father died from carcinoma of the stomach, at the age of 78. Mother died from apoplexy at the age of 67 and had good vision. Two

Fig 1.—Lerner's case of oxycephaly with ocular complications. Right side of face.

brothers are living and well. They have no cranial deformities or ocular disturbances. One of them is myopic and wears glasses. Two brothers died in infancy, cause unknown. His grandparents enjoyed good vision and were free from abnormalities of the head.

Personal History: He was told by members of his immediate family that he was a premature baby (seven months). Had ordinary childhood diseases. He states that he had pertussis at the age of five years and the attack was very severe, accompanied by many convulsions. His loss of vision is dated from that time. He had influenza six years ago. No other infectious diseases and no operations. Denies venereal infection.

Ocular History: Became blind in the right eye at the age of five, following whooping cough. The other eye, he thinks, became blind gradually. He states that he is still able to read, to some extent, when the print is very close to his eyes. He consulted many oculists during his lifetime and obtained no relief.

General Appearance: The forehead is very long, straight and tapering upwards. All anatomic landmarks of forehead are practically absent. No evidence of supraorbital ridges. A triangular indentation over the orbital arch is present. The vertex is dome shaped. Skull measurements: Circumference 54 cm. Vertical d. 17.5 cm. Transverse 15.5 cm. Index 88%. Eyes are promient, showing moderate exophthalmos and considerable nystagmus, rotary in type. Upon rotation of eyeballs to the extreme left, the nystagmus is considerably increased; otherwise the ocular musculature is unimpaired. Conjunctivas and corneas normal. Pupils are about four mm., equal, regular, reaction to light very sluggish and none to accommodation.

Fig. 2.—Lerner's case of oxycephaly; showing left side of head and face, almost lateral view.

Ophthalmoscopically: Both eyes: Media are clear; nerveheads snow white, margins well outlined. Vessels of normal caliber and course. No lesions are present in the maculae and periphery.

Vision in the right eye: Light perception.

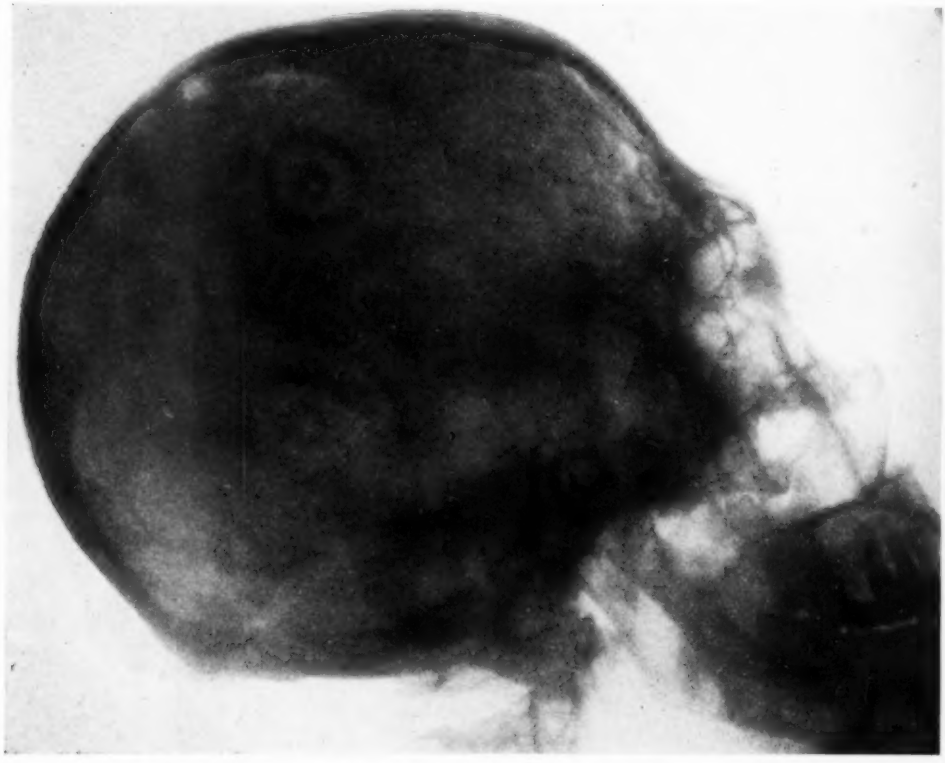

Fig. 3.—Lateral Roentgenogram of Lerner's case. Shallow orbit, well developed sella and sinuses. Protrusion at bregma.

Vision in the left eye: Less than 1/60.

Diagnosis: Oxycephaly and Optic Atrophy.

Laboratory Findings: His Wassermann is negative, to both alcoholic and cholesterin antigens. Urine does not show anything abnormal.

General Physical Examination: Negative. His mentality is good. He plays violin, piano and other instruments, and enjoys a comfortable living from tuning pianos.

COMMENT.

V. Graefe in 1886 reported the first case of oxycephaly in a male child eight years old. Double choked discs were noted, altho in a mild degree. Since then many cases were reported in literature; most of them described with the characteristic cranial deformity associated with ocular phenomena.

Most of Schuller's cases were young individuals under fourteen, of the male sex. Their symptoms consisted mostly of ocular disturbances, progressive blindness in consequence of optic atrophy. In many of them were found chorioretinitis, cataract and congenital nystagmus. Many of the cases presented themselves also with symptoms of intracranial pressure; epilepsy, migraine, psychosis and a number suffering from accessory sinus disease.

The ocular symptoms with which the patient presents himself are:

1. Impairment of vision.
2. Nystagmus.
3. Exophthalmos, in 50% of cases.
4. Divergent strabismus.

Turricephaly or, as called by the Germans, turmschädel, is the most frequent manifestation of craniostenosis. Among 5,000 patients with diseases of the head, who have been examined roentgenologically by Dr. Arthur Schuller, of Vienna, the diagnosis of turricephaly could be made 67 times, as contrasted with about 10 cases of scaphocephaly, plagiocephaly and others. The most frequent type of oxycephaly is the one in which the cranium shows a horizontal circumference approaching the shape of a circle. The forehead is, in this case, high and slopes up. The vertex is broad or sometimes pointed.

The average height of four skulls were measured to be 143 mm., while that of 100 normal skulls measured 131.6 mm. The average depth of the orbits of tower skulls were found to be 28.4 mm. compared to the normal depth of 39.05 mm. The superciliary ridges are flattened and protrusion of the temporal regions, with bowing outward of the zygomatic arches. The roof of the orbit may form an angle of 45° with the floor.

A characteristic detail of those with turricephaly, is the prominence of their eyes. This results from the expansion of the middle skull fossa, especially its anterior wall formed by the greater wing of the sphenoid bone. In this way the posterior wall of the orbit becomes bulged forward and hence the orbit is shortened. The premature synostoses do not appear only in the vault, but also in the bones of the face and therefore a narrowing of the orbit occurs.

The nasal framework sometimes shows a peculiar appearance. Deviation of the nasal septum occurs frequently. The nose is usually very prominent. There is a predisposition to disease of the sinuses in these cases, on account of the peculiar configuration of the nasal structures. The shape and position of the jaw and teeth are often very irregular. Especially noticeable is the shortening and deepening of the anterior fossa. The lesser wings of the sphenoid show a steep rise upward laterally instead of straight out laterally. This changes the position of the optic canal. The latter may be kinked or narrowed. The sella is widened and deepened.

The Pacchionian grooves and the vessel furrows on the inner surface of the skull are deepened, in most cases. The vault is usually thin. It can be readily seen, from the description of the cranial deformity, why we should have definite clinical symptoms, chiefly cerebral and ocular and at times referred to the ear.

The most striking ones are the ocular phenomena. The disturbance in the optic nerve may occur in childhood and cause complete blindness. It may occur in later life. The involvment of the optic nerve may be due to kinking or narrowing of the optic foramen, or may be due to intracranial pressure. Choroiditis and cataract are also often present. Disturbances of the olfactory nerve were observed by Marchand. Headache is the important symptom next to the ocular phenomena. It may occur periodically, and at times assume a migrainous character. The headaches appear also in earliest childhood, therefore it is important to think of the posibility of craniostenosis. Epileptic and epileptiform attacks may be present. The oxycephalic patients are, as a rule, intelligent; at times, however, they suffer from psychic disturbances.

Early synostosis of the sutures causes neuritis followed by atrophy of the optic nerve, the intracranial pressure being the main factor. The vault of the skull is restricted in both anteroposterior and transverse diameters. To accommodate the growing brain increase in height of vault occurs. Another explanation is advanced that the condition is not due to intracranial pressure but to an anomalous position of the carotid artery, pressing the optic nerve against the orbital roof, at the inner end of the floor of the optic canal.

The sella turcica was found to be enlarged and displaced, in some cases. (Grumnach's and Holloway's cases). Shannon's case on postmortem showed the optic nerves fitted closely in their

foramina, but there was no narrowing from osteitis and hyperostosis.

Tower skull is more common in the male. Mehner's explanation is that in boys the brain grows more rapidly. The cranial deformity usually develops from the second to the sixth year of life, when the growth of the head proceeds. Inflammation of the meninges during fetal life, is given by some as a cause of premature synostosis. Rickets is mentioned as an important etiologic factor. Eighty-five percent of Bertolotti's cases were rhachitic. Others who have reported large series of cases state that no evidence of rickets were found. Syphilis and traumatism are mentioned as causes. Doctor Zentmayer in discussing Shannon's case relates a case of his own, where a mild degree of oxycephaly existed in association with zonular cataract, the latter a frequent associate of rickets.

My patient did not give a history of rickets.

Roentgenologic Findings: Middle and posterior fossae are nearly on same level. Sella turcica is deepened and widened. Sinuses are almost obliterated. Bones of the cranium are thinned out and formation of digital depressions present, are due to the pressure of the convolutions of the brain. Bulging of the anterior and posterior fontanelles may be noted.

TREATMENT: Lumbar puncture in Shannon's case evidently gave relief; but it is not free from danger, as the cerebellum may be sucked into the vertebral canal. Subtemporal decompression is recommended. It relieves headache and is only palliative. It may possibly prevent blindness. Trephining and ventricular puncture are the most promising operative procedures.

Hildebrand operated five times on three children with tower skull. The optic foramen was reached by separating the periosteum, chiseling a groove in the roof of the orbit to the foramen and gouging away the upper margin of the foramen. Atrophy was arrested in his cases and improvement of vision followed. No disfigurement was caused by his operations.

SUMMARY: (1) Cranial deformity is due to premature synostosis of the sagittal and coronal sutures, followed by increase in height of vault, in order to accommodate the growing brain.

(2) Ocular phenomena usually present are: exophthalmos, nystagmus, divergent strabismus and optic atrophy.

(3) Rickets is a possible etiologic factor.

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TOTI'S OPERATION FOR DACRYOCYSTITIS WITH REPORT OF SIXTEEN CASES.

V. L. Raia, M. D.

PROVIDENCE, R. I.

This report of cases shows the good results of dacryocystorhinostomy immediately and many years after the operation; what experience has taught the writer in regard to its performance; and considerations on the function of the lacrimal apparatus. Read before the Rhode Island Ophthalmological and Otological Association, October 9, 1924.

In 1915, I reported before this association twelve cases of dacryocystorhinostomy and now I submit for your consideration sixteen others. I have had the opportunity to see occasionally most of the patients of the first group; and I have noticed that those who were considered cured immediately after the operation have continued to be so up to the present time, the scar has gradually decreased and the drainage, except in one, is still perfect. In the others, the socalled improved ones, all discharge of mucus or pus has ceased, but tears are seen running from the inner corner of the eye in the wind and cold weather; a condition which is not worse than that observed after extirpation of the sac. I refer those who wish to know the details and the technic of this so much discussed operation to an article by Dr. Toti in the June number of the Annales d'Oculistique, 1910, in which the anatomy and the pathology of the lacrimal apparatus are splendidly described, and to my article just mentioned. The object of this operation is to stop the discharge from the lacrimal puncta, and to reestablish at the same time the conduction of tears into the nose, which is obtained by removing that bony partition (nasal process of the superior maxillary bone and lacrimal bone), separating the nasal mucous membrane from the internal wall of the lacrimal sac, and by rendering this latter and the nostril one common cavity. It is easy to understand that to produce this common cavity the inner wall of the sac, and a corresponding part of the mucous membrane in front of the middle meatus, must also be resected.

I shall speak briefly of the present cases.

Case 1. Man, 25 years of age, had been suffering from chronic dacryocystitis of the right eye with profuse discharge for a long time. No probes had been used previous to Toti's operation which was performed in March, 1915, with an ideal result; that is with the immediate arrest of discharge and perfect drainage of tears. These conditions persist to the present date. Scar is hardly visible.

Case 2. Woman, 24 years of age, with chronic dacryocystitis of both eyes. Was operated at the Rhode Island Hospital first on the right side in January, 1915, with perfect result, and four weeks later on the left, where only a slight epiphora remained. Patient has not been seen since she was discharged from Hospital.

Case 3. Man, 53 years of age, with profuse discharge from the left lacrimal sac had dacryocystorhinostomy in June, 1915, at the R. I. Hospital. Discharge stopped immediately after operation but lacrimation has persisted up to the present date.

Case 4. Woman, 36 years of age, with chronic right dacryocystitis. Dacryocystorhinostomy was performed in January, 1916. The immediate result was perfect, but after six months patient returned with lacrimation for which I advised probing. She refused any further treatment and has not been seen since.

Case 5. Woman, 59 years of age, was suffering from dacryocystitis of the left side with suppuration and lacrimal fistula. Operation was performed in February, 1917, with an ideal result. Good conditions have continued to the present date.

Case 6. Man, 25 years of age, had been suffering since his infancy from chronic dacryocystitis. Both lacrimal sacs were dilated and on account of this he had been rejected from military service, here and in Europe. Intranasal operation was performed on the left side by another physician with bad

result, the discharge becoming more abundant and more purulent. After two months of useless treatment I enucleated the sac, and in November, 1917, I subjected him to right dacryocystorhinostomy with immediate perfect result. At present these conditions continue to exist on the right side, while on the left there is a slight but annoying epiphora. Scars on both sides are hardly visible.

Case 7. Man, 35 years of age, with chronic dacryocystitis was operated in January, 1918. Discharge ceased immediately, drainage of tears became perfect. Patient has not been seen since he was examined, four weeks after the operation.

Case 8. Man, 45 years of age, had been annoyed for a long time by lacrimation and secretion of mucopus from the lacrimal sac of the left eye. Dacryocystorhinostomy was performed in May, 1918, with an ideal result, which continues up to the present date. Scar was rather big at first, but has greatly diminished now.

Case 9. Woman, 40 years of age, had been suffering from dacryocystitis for several years. Toti's operation was performed in January, 1919. Discharge disappeared after few days and drainage of tears into the nose became reestablished. These conditions continue to be the same at the present date. Scar is hardly visible.

Case 10. Man, 50 years of age, with chronic dacryocystitis of the left side was operated in May, 1920. Discharge stopped, but lacrimation still persists.

Case 11. Woman, 38 years old, had been affected with chronic dacryocystitis of left side for a long time. Dacryocystorhinostomy was performed in February, 1920. Discharge ceased immediately after the operation and the conduction of tears into the nose became normal, a condition which has not changed at the present date. Scar is rather large.

Case 12. Woman, 58 years old, with chronic dacryocystitis of the left side, was operated in August, 1920. Discharge disappeared but epiphora still continues.

Case 13. Woman, 40 years of age, had chronic right dacryocystitis with acute inflammation of the neighboring tissues. When the external inflammation had subsided, Toti's operation was performed in May, 1922. The result was perfect and conditions until now have not changed. The scar, which after the operation was very large, is now greatly reduced.

Case 14. Man, 28 years of age, had the right eye continuously bathed with mucopus from dacryocystitis of long duration. Was operated in December, 1923. Profuse discharge ceased and drainage of tears became normal. A year after the operation no change had taken place and the scar which at first was very noticeable had greatly diminished.

Case 15. Woman, 36 years of age, had at the time of her first visit an attack of acute inflammation of the right lacrimal sac, with great swelling of the surrounding tissues for which an incision was made. After the inflammation had disappeared dacryocystorhinostomy was performed in April, 1924, with the result that the discharge disappeared and conduction of tears into the nose became normal. These conditions are the same at the present time.

Case 16. Woman, 37 years of age, had twelve years ago extirpation of the right sac. Ten years ago the left eye began to be watery in the wind and cold weather, and then white secretion appeared in the inner corner. Last December the region around the sac became red, painful and swollen and then broke, giving exit to considerable pus. The same thing happened several times during the month. The 14th of January, 1925, the acute inflammation had subsided, but there remained a lacrimal fistula. Dacryocystorhinostomy was performed and after a week secretion had disappeared, fistula had closed, and the drainage of tears into the nose had become reestablished. Scar from the very beginning has been very small.

Of the above cases (case No. 2 operated on both sides) 12 had an ideal result, and five were relieved only from the dangerous discharge. The epiphora which remained in these latter ones has steadily diminished, to such a de-

gree that now the patients hardly complain of it.

All the operations have been made under local anesthesia by injecting deep in the region of the sac, a solution of cocain 2% and adrenalin (except the last case in which novocain 2% and adrenalin was used); but while the pain has been very insignificant the hemorrhage has always given me trouble and annoyance.

Some have objected to the deformity produced by the scar and have advised a different direction of the incision around the inner corner of the eye to avoid it. But I think that the original semielliptical incision, recommended by Toti, is the best, because it follows more the disposition of the lines of the skin, in the region where this operation is made. In general it can be stated that the more depressed the root of the nose the more visible the scar; which on the other hand, in some subjects, is hardly noticeable after the lapse of a year or two, as we have just seen in some of the cases reported. Suppuration of the sutures, which occasionally takes place without impairing the final result, is a factor in the production of an uneven and thicker scar.

To avoid the infection of the wound the best thing to do, according to my personal experience, is to pack the nostril corresponding to the operated side with gauze, which must be removed after four or five days, and to advise the patient not to blow the nose. It would seem that to keep a tampon so long is against all rules and practice of rhinology; but I think this is the only way to leave undisturbed the healing process of the remaining anterior wall of the sac, to the bony opening made in the nose.

On the other hand, I have never seen the gauze which I remove stained badly with pus, or giving offensive odor. The periosteum is adherent to the nasal process of the superior maxillary bone and very adherent above, in correspondence to the suture, which separates this process from the frontal bone; and to detach it with a common periosteal elevator I find very difficult. I have used for several years a sharp instrument, a regular chisel, curved on the edge, even in the lacrimal fossa where the periosteum is rather loose. When this region is reached the flap, comprising the periosteum, the lacrimal sac and skin can be turned outside with great facility. To protect the sac while the bone is being removed, any lid retractor with sufficient quantity of cotton impregnated with cocain and adrenalin interposed is sufficient.

Toti is very particular in recommending not to perforate the nasal mucous membrane but to cut carefully a disk of it corresponding in size to the external wall of the lacrimal sac, left with the canaliculi intact only when the bone has been completely removed. In all my cases I have been very careful to follow this advice. But having observed no untoward effects by the accidental laceration of the mucous membrane of the nose before the bony partition had been completely removed I became convinced that this precaution, while good, is not absolute. The resection of the bone must be very generous, especially downward toward the lower margin of the orbit where the nasolacrimal canal begins, so that an opening may result 18 mm. in the vertical direction and about 15 mm. wide.

If the anterior ethmoid cells reach the fossa sacci lacrimalis, these must be removed to remove all sources of infection. As this opening which results must come in front of the middle meatus the nose must be examined to see if this region is free, or obstructed. If it is obstructed by deviation of the septum, enlargement of the middle turbinate, tumors, etc., these defects must, previous to dacryocystorhinostomy, or at the same time, be corrected. It is the disregard of these precautions which produce many failures.

A perfect result is obtained only when the nasal cavity is normal and the canaliculi have not been dilated with probes or incised; that is, when the muscular and elastic fibers have not been unnecessarily stretched. The contraction of these muscular fibers produce dilatation of the canaliculi,

and suction of the tears from the conjunctiva into the nose. To understand this fact we must consider that the said fibers are disposed in a horizontal direction and parallel to their lumen, and are a direct continuation of the palpebral portion of the orbicularis. That the dilatation of the sac in the act of contraction of the orbicularis, is not the principal factor of the conduction of tears into the nose, is proved by the ideal result of dacryocystorhinostomy which practically abolishes its cavity. This is the reason why the worst conditions of the sac, as its great dilatation, fistula, infiltration of the tissues around it, do not constitute a contraindication for the success of the operation, if the structure of the canaliculi is not altered.

I have observed that when the eyelids contract, the eyeball rolls upward and slightly retracts into the orbit; a movement which can be seen by holding both lids separated with the fingers of both hands and inviting the patient to close forcibly the eye. This movement of the eye favors the accumulation of the tears on the inner corner, from which place they are sucked thru the puncta into the nose. This rolling and retraction of the eye, altho imperceptible, takes place in the act of winking; when at each closure of the lids the canaliculi dilate by the contraction of their horizontal muscular fibers, as we have already said, if the internal palpebral ligament is intact. In dacryocystorhinostomy, after the external flap, comprising the skin, the external wall of the sac, the periosteum has been replaced and properly sutured the said ligament becomes reattached to its normal place on the nasal process of the superior maxillary bone, and its function consequently in regard to the sac and specially to the canaliculi remains normal. Toti recommends great precaution at the beginning of lacrimal disturbances or at any other time, and advises against probing which, according to him and other writers, produces more harm than good.

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RETROBULBAR SPINDLE CELL SARCOMA.

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SCHENECTADY, N. Y.

This patient showed proptosis, reduced vision, impaired visual fields and protrusion of the optic nerve entrance. A Krönlein operation was done and a tumor found within the muscle cone that proved to be a spindle cell sarcoma. Read before the Eastern New York Eye, Ear and Throat Association.

A review of the literature covering orbital tumors, discloses the fact that a fairly large number of cases have been reported, including cyst, endothelioma, glioma, neurofibroma, chloroma, lymphangioma, lymphosarcoma and carcinoma. The end results from both the standpoint of vision and life were, as might be expected, decidedly unfavorable. Not finding a spindle celled sarcoma among the reported cases, together with the fact that at the end of two years, there has been no recurrence, prompts me to report this case.

On September 30, 1922, L. Q., female, age 13 years, presented herself for examination. She was referred by Dr. F. E. White of Schenectady, N. Y. Her chief complaint was poor vision in the left eye, which she had noticed first about a week before.

History. In June 1922, both she and her mother noticed that the left eye was larger than the right, but paid no attention to it. About a week ago, the right eye was accidentally covered, when it became evident that she could not see with her left. There has been no increase in size since June. Two years ago the eyes were tested by an optometrist and no diminution of vision was noticed in the left. Menstruation started one year ago. Family history, negative.

Vision R. 20/15. Vision L. hand motion at eight feet, counts fingers at two feet. Marked exophthalmus of the left

eye, with widening of the palpebral fissure. The conjunctiva, cornea and anterior chamber normal. Pupils normal in size. Both react to light but the left is sluggish; consensual reaction and accommodation normal. Iris normal; tension normal. Excursions of the eye in six cardinal positions show motility normal.

Confrontation test shows a limitation of the visual field below, with a suggestion of enlargement of the blind spot or a central scotoma. Palpation elicits nothing in the orbit. Fundus R., under mydriatic: The disc is elevated three diopters. Blood vessels are distinct with the veins enlarged. The disc margin is slightly hazy but there is no haziness or inflammation in the surrounding retina. The disc appears to be pushed forward mechanically without the usual inflammatory hazy appearance of a choked disc.

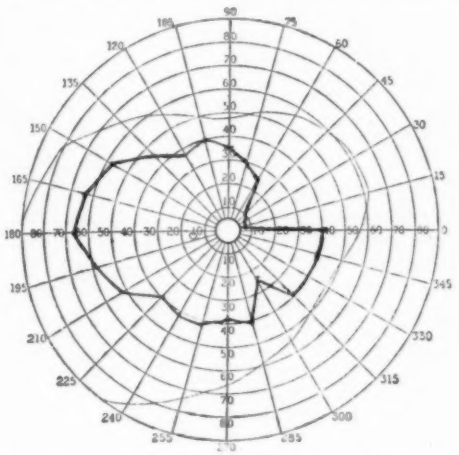

Fig. 1.—Field of vision for left eye, October 9, 1922.

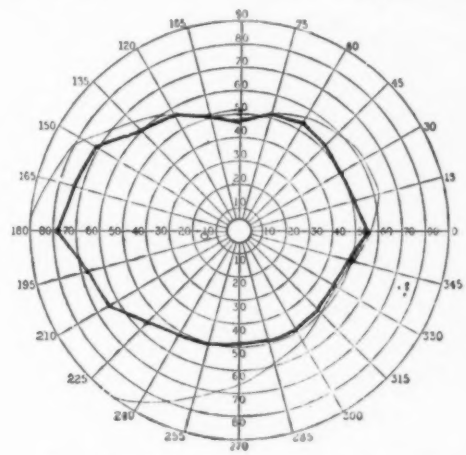

Fig. 2.—Field for left eye, October 24, 1922.

The exophthalmus measures five millimeters. Nose, throat and ears negative. No evidence of sinus disease. Transillumination and all X-ray findings negative. Wassermann report from Schenectady City Laboratory—negative. Wassermann report from New York State Laboratory—negative. Field chart made October 9, 1922, is herewith shown. Fig. 1.

On the above findings a diagnosis of retrobulbar tumor was made. During the period of the above examination a Clinical Day held in Albany, New York, gave opportunity to present this patient. Drs. J. I. Dowling, A. C. Worth and H. M. Grogan, confirmed the diagnosis, as did Dr. A. J. Bedell later in the day.

On October 10, 1922, under ether anesthesia a Kroenlein operation was performed. A tumor was palpated within the muscle cone. Tenon's capsule was incised, above the external rectus, enough to admit a forefinger. A bean shaped, encapsuled mass, measuring 2 centimeters in its longitudinal and 1½ centimeters in its horizontal diameter, was shelled out, apparently in toto.

Dr. Warren B. Stone of the Ellis Hospital laboratory returned a report of spindle celled sarcoma, which report was confirmed by Dr. E. Mac D. Stanton who also examined the specimen.

One error was made at the operation. The exophthalmus disappeared so completely after the tumor was removed that it was not deemed necessary to stitch the lids together. That this was a mistake, however, developed the day following. The postoperative swelling was so great that the lids were forced apart to such an extent that the cornea was entirely exposed. While constant care avoided more than a mild keratitis, which eventually cleared up entirely, continuous removal of the dressings was necessary and needless anxiety as to the eventual outcome, was caused, which could have been avoided.

On October 17, 1922 the vision had improved. No test was made, the patient simply remarking the improve-

ment when the dressings were removed. Fundus examination at this time showed a diminution of the nervehead protrusion to slightly less than one diopter. The entire retina was hazy.

On October 20, 1922, the cornea was somewhat cloudy. On October 24, the retina was less hazy. There was some increased swelling of the upper lid and

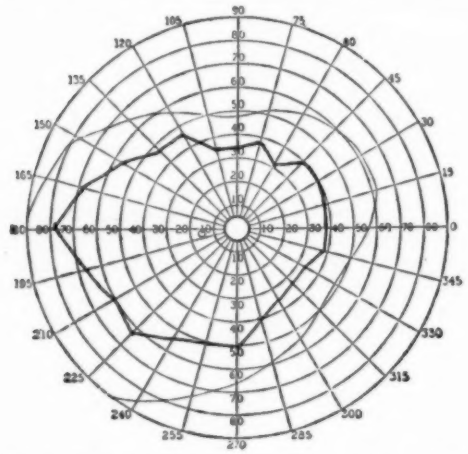

Fig. 3. Field of vision of left eye September 16, 1924.

the patient complained of both soreness and headache. This was in part due to the fact that she came to the office for the first time after leaving the hospital.

Vision at this time was increased to counting fingers at six feet and a marked improvement in the field as shown herewith. Fig. 2.

October 31, 1922—Vision under mydriatic, R. 20/15 with plus 0.50 sphere, combined with plus 1.50 cylinder, axis 105 degrees. L. 10/50 with plus 1.25 sphere, combined with plus 0.50 cylinder, axis 90 degrees. The media were more clear but the nervehead still showed slight elevation.

November 9, 1922. Fundus was quite clear. The pupil was still dilated, altho no atropin had been used for ten days. The nervehead still bulged a very slight amount, evidenced by the curve of the blood vessels.

November 28, 1922. Patient complained of pain in the eyeball and in scar. The scar was especially uncomfortable when near a stove. Fundus was clear and the pupil still dilated. The disc was normal.

March 29, 1923. Complained of headache for which no cause could be found. The vision had improved slightly.

November 17, 1923. Had headaches occasionally thru the summer. Said she noticed that headaches were relieved by removing the glasses. Examination showed she was wearing too much plus sphere. The hyperopia had decreased with the recession of the nervehead. She was told to leave off her glasses and two weeks later, December 2, 1923, she 'phoned that she had had no headache.

September 16, 1924. Reported that headache had ceased. Fundus clear. The disc was quite white. Vision O. S. 20/200+ uncorrected. The field examination is shown herewith. Fig. 3. There is no deformity, and the scar has contracted to a small white line.

It might be added that prophylactic doses of X-ray were given at lengthening intervals for the first six months.

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ADRENALIN CHLORID WITH SPECIAL REFERENCE TO ITS SUBCONJUNCTIVAL INJECTION FOR GLAUCOMA.

G. Oram Ring, M.D.

PHILADELPHIA.

The general action of adrenalin is here outlined including the views of a prominent teacher of applied therapeutics. Four cases are reported in which outbreaks of acute congestive glaucoma were controlled largely by such injections. The cases were briefly presented at the January, 1925, meeting of the Section on Ophthalmology of the College of Physicians of Philadelphia, see p. 573.

Balfour first showed the medulla of the suprarenal gland to be an outgrowth of the sympathetic system. Its cortex is mesoblastic in origin and does not contain epinephrin. The active principle of the gland is an exceedingly powerful therapeutic agent, indeed the most powerful vasoconstricting drug known. It has been exhaustively studied by the pharmacologist and its importance elaborated by the applied therapeutist, but from the standpoint of the ophthalmologist it has found a comparatively restricted field of usefulness.

A publication by Dr. Gradle of Chicago in the November number of the American Journal of Ophthalmology upon the subconjunctival injection of adrenalin solution 1-1000, in glaucoma, emphasizes the importance of the remedy, furnishes an excuse for a very brief review of its systemic and local effects and permits a word regarding a few recent experiences with the drug in increased intraocular tension.

The notes are appended in the spirit of frankness which has characterized Dr. Gradle's contribution and which may simply stimulate further use of the remedy, until its value or nonvalue as a permanent addition to our ophthalmic armamentarium may be established.

To the experience of Rollet and Curtil in 1911, of Erdman in 1912, of Fromaget in 1914, of Hamburger in 1923, and of Fehr, Hegner, Eppenstein, Polack and Gamble in 1924, Gradle has added his personal experiences in sixteen cases, forming from his combined study certain tentative conclusions, which we are asked to modify or confirm. As the outcome of our general study we are accustomed to consider adrenalin in the arresting of hemorrhage, in enhancing the anesthetic effects of cocain, in quieting the paroxysm of bronchial asthma and, when used intravenously, in tiding the patient over circulatory collapse, as for example in surgical shock. It is entirely ineffective when administered by mouth, but slightly effective subcutaneously and of moderate efficiency only when used intramuscularly. The slow absorption permits the destruction of the epinephrin before it reaches the circulation. Its brief action is due to its rapid disappearance from the blood, by reason of quick oxidation and destruction. Ordinarily when used locally, or even hypodermically, it produces no symptoms.

In excitable or susceptible persons, especially those with Basedow's disease, the response is expressed in tremors, anxiety, nervousness, palpitation, precordial distress, increased pulse and respiration, rise of blood pressure and temperature and sometimes by glycemia.

The typical action of this powerful agent consists, according to Sollman, in a highly specific stimulation of the physiologic endings (receptive substance) of the entire sympathetic system. A temporary rise of blood pressure is induced by peripheral stimulation of the vasoconstrictor mechanism of the systemic vessels and of the accelerator mechanism of the heart. Vagus stimulation constitutes the third factor in inducing the systemic circulatory effects. It was only in 1914 that Pilcher announced that its injection under pressure into the nasal submucosa is almost equivalent to intravenous injection. In overdose intravenously, it kills by acute dilatation of the heart and by induction of pulmonary edema.

Ampoules of adrenalin can be sterilized without loss of activity. In un-

sealed solutions exposed to the air it can be sterilized without loss of power, by boiling once or twice. When used locally by dropping into the eye, it produces the effects of sympathetic stimulation, namely pallor of the mucosa, widening of the palpebral angle and a slight exophthalmos.

One of the authorities consulted in connection with this brief study was the work of Dr. A. A. Stevens, Professor of Applied Therapeutics in the University of Pennsylvania. Desiring to have a recent pronouncement, I wrote to Dr. Stevens asking for an expression of his opinion covering questions as to local reaction under varying systemic conditions, especially involving the matter of a return flush, (vasodilation), the risk involved in subconjunctival injections up to six minims, the value of the Loewi reaction and the comparison of cocain and epinephrin.

Dr. Stevens has been kind enough to favor me with the following reply:

"Epinephrin when applied to the conjunctiva is ordinarily without effect on the pupil or the intraocular tension. However, mydriasis may occur if the sympathetic mechanism is abnormally sensitive, as in hyperthyroidism, if the oculomotor tone is low, or if absorption of the drug is facilitated by active congestion or acute inflammation of the conjunctiva. The mydriasis, which is accompanied by widening of the palpebral angle and sometimes by slight protrusion of the eyeball, depends upon stimulation of the endings of the sympathetic nerves, this being the dominant action of epinephrin and the one responsible for its most important systemic effects. When epinephrin is injected beneath the conjunctiva it regularly produces mydriasis and other evidences of sympathetic stimulation. The mydriasis is submaximal and may be increased or made maximal by depressing the oculomotor endings with atropin. Loewi suggested the mydriatic response to local applications of epinephrin to the conjunctiva as a diagnostic sign of pancreatic insufficiency and of hyperthyroidism, but the effect was not sufficiently constant or restricted to be trustworthy.

Epinephrin mydriasis is accompanied by a decrease in the intraocular tension and this effect is apparently due to pronounced local vasoconstriction and, possibly, secondary lessening of the lymph flow into the ocular chambers, actions which more than counteract the interference with drainage caused by crowding back of the iris.

Epinephrin vasoconstriction is always followed by vasodilation, and in the eye this secondary effect results, according to Rupert, (Bioch. Centr. 1909, viii, 898), in increased intraocular pressure. Exceptionally, glaucoma has occurred after the use of cocain and even epinephrin (Gifford) (Quoted by Sollman, A Manual of Pharmacology, 1922, 343). It would seem to be advisable, therefore, in using epinephrin subconjunctivally in the preoperative treatment of glaucoma, to follow the injection with the instillation of a miotic, such as physostigmin.

It is very doubtful whether the subconjunctival injection of 5 or 6 minims of a 1-1000 solution of epinephrin would have sufficient effect upon the general arterial tension to prove harmful, even in the presence of cardiovascular disease and hypertension, which are common accompaniments of glaucoma. Subcutaneous and submucous injections of epinephrin, if not under pressure, have comparatively little effect upon arterial tension, because of the local vasoconstriction and the slow absorption of the alkaloid.

The effects of epinephrin and of cocain on the pupil, ocular vessels and intraocular tension are qualitatively similar, altho those of cocain may be obtained by local application to the conjunctiva. Both drugs stimulate the peripheral sympathetic mechanism, but the vasoconstricting effect of cocain is less pronounced than that of epinephrin, and therefore its effect upon intraocular tension is less constant."

We are all familiar with the article by Knapp, describing the instillation into the eye, with resulting dilatation of the pupil, as a diagnostic sign in glaucoma. It is, however, with its value in subconjunctival injections that we are especially concerned. Consid-

erable testimony has been adduced pointing to its definite value in aiding the breaking up of adhesions, where atropin has only been partially successful; and even of greater importance is the testimony as to its usefulness when, despite our desire to continue the mydriatic, we are compelled to resort to the miotic because of the sudden rise in tension.

The injections should certainly be tried in this type and our experiences reported, keeping in mind, however, that Erdman issues a warning to be cautious. No specific instances of failure are quoted by him, and Hamburger strongly urges its use under the circumstances, as well as to dilate the glaucomatous pupil for ophthalmoscopic examination. In four out of six cases of this type Gradle felt that he had proved its usefulness. In the simple noncongestive type, Hegner in one instance and Hamburger in a second induced an acute inflammatory glaucomatous outbreak which was controlled by a miotic.

An opportunity quite recently presented itself to utilize the subconjunctival injection method in three male patients, in one of whom it was used in both eyes. Two of the three patients were referred by an ophthalmologist, who recognized the gravity of the symptoms and who made the request that I subject them to whatever remedial measures my judgment dictated. The almost immediate and rather startling diminution of tension prompts this brief notation. In each of the four eyes the reduction was followed in about forty-eight hours by a posterior scleral puncture, in one of the four a double scleral incision having been made, with moderate vitreous extrusion in each case.

Case 1. A man of 74, first seen November 1924, upon whose left eye the late Dr. Samuel D. Risley had done a classic iridectomy, of the type which Dr. Risley always preferred—broad, flaring and made with three cuts of the scissors, the iris being perfectly removed to the root. In this eye the tension was still normal, the eye absolutely quiet, the lens somewhat opaque and the vision 20/100. The field was contracted. In the right eye the tension was 73, the anterior chamber very shallow, the lens showing signs of incipient cataract, the striae encroaching on the pupillary area. The cornea was steamy, the vision about 20/150, and the eye in the congestive glaucoma stage, with rapidly decreasing vision and moderate pain, and his systemic state one of advanced cardiorenal disease. Vision had been failing for several months following a series of congestive attacks. Under the precautions suggested by Gradle 4 minims of a 1-1000 solution of adrenalin chlorid were injected under the conjunctiva, mid-way between the lower corneal border and the lower conjunctival cul-de-sac. The tension was reduced to 43, later to 30 and later, following posterior scleral puncture, it fell to 22. Pain and congestion disappeared, vision improved to 20/50 and the field slightly enlarged.

Case 2. Male, aged 75. First seen November 18th, 1924. O. S. blind for seven months. Pupil fixed. 4 mm. in diameter. Cornea typically "needle stuck." No adequate view of fundus. Anterior chamber nearly obliterated. Episcleral venous engorgment with considerable pain. Tension with Schiötz's tonometer 83 (chronic glaucoma with recent congestion). O. D. There was a history of recurring attacks of congestion with diminution of vision and many changes of glasses during the previous six months, but apparently no adequate conception of the serious direction in which these symptoms pointed. There was a sudden failure of vision during the early morning hours of November 18th, 1924, after which he was taken to a competent oculist who recognized the condition, but did not care to assume the responsibility involved. Episcleral vessels full, anterior chamber shallow. Pupil 4½ mm. contracting under oblique illumination to 3½ mm. Fingers counted dimly and eccentrically at one foot. Patient groped his way as tho nearly blind. Tension 72. General blood pressure high and the systemic picture one of cardiorenal

disease. This patient had had recurring waves of mental haze for a year or more; and following the bandaging of the eyes, subsequent to posterior scleral puncture, became a typical post-operative dement, but quickly improved upon removal of bandage and the use of morphin and veronal.

He was put to bed on the afternoon he first reported, and after the usual preliminary treatment was given the following day, 4mg of a solution of adrenalin 1-1000, subconjunctivally in each eye. In twenty-four hours the tension of O. D. had dropped from 73 to 32 and in O. S. from 83 to 43, and in forty-eight hours slightly lower, 30 and 40. On November 26th, 1924 the tension in O. D. was 20 and in O. S. 22. On November 27th a posterior scleral puncture was performed upon O. D. and on Dec. 1st upon O. S., following which the tension of O. D. was 17 and that of O. S. 20.

Attention was given to the gastro-intestinal tract, the secretions alkalinized and an effort made to increase the activity of the skin. The edema of each cornea disappeared. In O. D. he was able to recognize one across the room, and later to read figures corresponding to 20/60 vision. O. S. became comfortable, but in this instance operation was performed only to postpone and if possible eliminate the necessity for enucleation.

Case 3. Male, age 68. Chronic glaucoma in each eye. Advanced cardiorenal disease. O. D. operated upon by a thoroly skilled surgeon in August last. Infectious material in each tonsil. Moderate degree of hyperplastic sinusitis on left side.

In the opinion of physicians in charge of the case, the general condition was too grave to permit removal of tonsils or operative intervention on the sinuses. The operation in O. D. referred to above, sclerocorneal trephining, was followed by an endogenous infection which left the eye flushed and watering with varying pain, not as a rule severe; iris bound to capsule but with a filtering scar and tension approximately normal. My advice was sought concerning O. S. which showed a typical glaucomatous field, narrow anterior chamber, central scotoma, rapidly diminishing vision and tension of 55 with recent flushing.

Adrenalin was used subconjunctivally, with reduction of tension to about 40 followed by double posterior scleral puncture. There was no pain whatever following the procedure. The punctures were made two weeks ago, the eye is about white, and comfortable with as nearly as can roughly be determined a lessening of the scotoma. This case is so recent that it is mentioned only because adrenalin was used.

In each one of the above cases, the systemic condition was grave. The preliminary reduction of tension by the injections, it was felt, lessened the gravity of the situation and constitutes the only reason for their presentation. It is regretted that the necessity of the cases prevented to a careful series of observations as to the approximate length of time the injections would have kept the tension down. It is not at all the purpose of the communication to discuss the operative procedure that was decided upon, neither is it claimed that some other more radical measures may not be required. In the first three of the four eyes about two months have elapsed and they continue to do well.

To the following statement from a recent presentation of glaucoma question, regarding the posterior route, the author hopes later to give himself the opportunity of adding some experiences.

"To be able to relieve immediately, the most intense pain, to convert an urgent necessary operation from being the most pregnant in possibility of disaster in the realms of surgery into a safe, easy and deliberate one is no small matter." It is thus possible to postpone further operation until the eye is quiet enough for trephining or iridectomy, or other operative procedure.

N. E. cor. Walnut and Seventeenth St.

REFRACTION AS I SEE IT.

E. J. GARDINER, M. D.

CHICAGO.

The importance of a carefully prepared history and complete ophthalmoscopic examination is pointed out. Vision and the range of accommodation should be carefully tested, before using a cycloplegic. Atropin is advised up to 35 years of age. Change in the axis of astigmatism may occur but often appears because of incorrect previous determination. Unrevealed muscle imbalance may prevent relief. Read before the Chicago Ophthalmological Society, Nov. 17, 1924. See p. 574.

Doctor Loring has asked me to speak to you on refraction. As an exhaustive paper on this subject is impossible in the circumstances, I shall limit myself to enumerate those steps in the procedure, which in my opinion, are indispensable, and to state the refracting technic that has given me the best results.

My apology for dwelling on details that lack the attraction of novelty, is that, so far as I can see, thoro examinations are not as usual as the importance of the work demands. If we are to live up to our high calling the most careful attention must be given to these apparently trifling details, for, "Attention to trifles ensures perfection, and perfection is no trifle."

Refracting eyes is not merely the fitting of glasses. To do refraction work properly, requires not only a clear understanding of physical and physiologic optics, but a practical appreciation of the protean effects of ametropia on the general system, and the effects of systemic conditions on the eyes.

Taking for granted that every ophthalmologist is conversant with physical and physiologic optics, that he has carefully studied the functions of the extraocular muscles and their relations to accommodation, does he, when he is consulted about asthenopic complexes carefully consider the individuality of his patient? In other words, has the physician been obliterated in the ophthalmologist?

A brief history consisting of answers to a carefully directed questionnaire should precede the physical examination of the eyes. This history should be taken by the ophthalmologist *himself*. If it is objected that such a process takes too much time, the answer is, charge for your time, or delegate the work to an assistant whom you consider to be as competent as yourself, and let him do the whole job, for he has become more conversant with the patient's individuality and is better able to meet the indications successfully.

A carefully prepared history is not only an excellent guide, but also an invaluable indicator of those pitfalls into which carelessness often leads the specialist: Promises to cure the pains of inherited migrain, when the correction of ametropia is but the elimination of a slight contributing cause; assurance of relief from dome headaches caused by uterine inflammations and retroversions; sick headaches resulting from gastrointestinal troubles; and last, but by no means least, rash promises of cure of those aches and pains complained of by neurotics, which persist in spite of the most careful correction of ametropia, faulty accommodation and muscle imbalance. These patients, the despair of the conscientious oculist and frequently the disparagers of his reputation, nearly always display signals of "danger ahead" to the man who makes a careful history.

I would not dwell on the importance of the physical examination of the eyes, were it not that quite frequently I am asked when I use the ophthalmoscope, "What is that thing, the other doctors did not use it." Such lack of thoroness is most reprehensible, for it puts the ophthalmologist on a par with the dispensing optician, with this difference, that the optician is not paid for the examination and the oculist is paid and is expected to look for any conditions in the fundus indicative of systemic disturbances, or of socalled eyestrain, and to advise the patient accordingly.

The opthalmoscope should be used in every case of refraction, both by the indirect and the direct method. In

examining the fundus by the direct method, I make it a practice to refract the eye. There seems to be quite a diversity of opinion regarding the accuracy of this test. Dr. Herman Knapp, who was very expert with this test, invariably demanded that it should be made in his office work, and I have used it ever since with satisfactory results. Of course, the first examination—without cycloplegia—gives but an approximate measurement of the refraction, but this is true of other methods, especially in children and young adults, for no test, objective or subjective, is accurate unless the accommodation is set at rest. Having made a record of all these findings, not omitting to record the tension, and having made a sketch of any pathologic conditions discovered in the fundus, the subjective test is in order.

It should consist of ascertaining the visual acuity of each eye separately and conjointly, range of accommodation for each eye separately and conjointly, muscle balance for distance and for the near point. If imbalance of the muscle is discovered, the power of adduction and abduction should be carefully measured, and a record made of all these data. This primary test is, I think, of great importance, not only for the information that it affords, but as a protection against the claim sometimes made that the cycloplegic has injured the eyes. In these days, when such a vicious propaganda is being spread against the use of cycloplegics, because of their "baneful after effects," one cannot be too careful in keeping a record of the findings before "drops" are put in the eyes.

When shall a cycloplegic be used, and which shall we choose? On this subject, also, there seems to be a great diversity of opinion. I shall not here discuss the matter, but shall simply limit myself to state what in my experience has given the most trustworthy results. So far, atropin has proved to be the only really reliable cycloplegic. I advocate its use up to the age of 35 or 40, and insist upon using it in patients up to the age of 25. If the circumstances render it impossible to use atropin, homatropin, its uncertainties of action having been explained, is substituted. But in young hyperopes, and young myopes of low degree, I never feel certain of having ascertained the total ametropia. One runs across too many cases of unduly undercorrected hypermetropia, overcorrected myopia, and of manifest myopic astigmatism, wearing a minus cylinder when hypermetropic astigmatism really exists, to leave any doubt in my mind that atropin always should be used when we seek an exact measurement of the static refraction. I may add that no patient of mine tested with atropin has subsequently developed so called acquired hyperopia.

Except in cases of marked ciliary spasm, it is not necessary to follow the old routine prescription, "One drop of a 1% solution of atropin instilled three times a day for a week." One drop of a ½% solution instilled three times a day for two days fulfills all the requirements. It is seldom that a patient presents himself after this treatment when the minus lens test does not prove that accommodation has been practically abolished.

That under atropin cycloplegia we are able to determine accurately the form and the axis of the anomalous meridian in astigmatic eyes, is a desideratum that is particularly valuable for the avoidance of the perplexities that arise when the axis of the anomalous meridian changes. The word avoidance is here used advisedly, because, excluding pathologic conditions of the lens, these changes of axis are due to unequal contraction of the ciliary muscle, and it is only when this muscle is set at rest that we are able to determine the true optical condition.

In the limited space at my disposal, it is not possible to dwell at any length on this phenomenon, but a few minutes spent on its consideration may prove profitable. In looking over my records of old patients who have returned for examination, I have not found an instance of change of axis where the test was made under atropin and the glasses prescribed were worn

constantly. This, of course, may be a mere coincidence, for changes of axes are not very common occurrences. Nevertheless, it is a fact worthy of consideration. How perplexing these cases are is well illustrated by a patient of whom Dr. Cassius Wescott spoke to me a few days ago. The precycloplegic test showed one axis, the cycloplegic revealed another, and the postcycloplegic gave another.

While measuring the slighter forms of astigmatism, great difficulty is occasionally experienced owing to the contradictory answers given by the patient. This is usually due to the fact that the difference in curvature of the principal meridians of the cornea is so slight, that the secondary meridians of the triaxial ellipsoid are a confusing element. In such cases the stenopaic slit gives very satisfactory results. If, when testing without a cycloplegic, one encounters a case of this kind, the difficulties are greatly increased by the added ciliary muscle problem. As an illustration, I will cite the case of a woman of marked nervous temperament who refused to have a cycloplegic used. With a difference of curvature between the principal meridians of half a diopter, in four successive sittings she placed the axis of the cylinder at three different angles from 105° to 135°. As I use the trial frame exclusively, lateral inclinations of the head could be excluded. The stenopaic slit finally fixed the axis of lesser curvature at 15°, and a plus 0.50 ax. 105° gave 20/20 and perfect comfort.

So much space has been devoted to cases of changing axis discovered at the time of examination, that little remains to consider in those cases that come to us complaining of discomfort and loss of visual acuity when using glasses that formerly were satisfactory in every respect. That such changes of axis occasionally occur is unquestionable, for I have seen the phenomenon in patients of whose refraction I had a carefully made record, and in former patients of confreres whose refraction work is always carefully done. It has been my experience that most of these changes occur between the ages of 45 and 65, which is significant. The treatment is change of the axis of the cylinder, to where it gives the best vision and most comfort, with instructions to return for examination every six months. I may add that a drop of a 1% solution of homatropin will frequently produce illuminating results.

Just a word regarding comfort. The eye functions obey certain well established laws of optics, but the eyes, like other organs of the body, are in their functions subject to that rather vague complex, individuality. Scientific refracting demands that we shall ever bear in mind the laws of optics, but in prescribing glasses we must also consider the pursuits, habits and idiosyncrasies of the individual. Therefore, while seeking to follow the precepts laid down in the classical works on the eye, we must, if we are to be successful practitioners, modify the precepts to meet the individual requirements, so that the patient may have his vision improved and derive comfort in the use of his eyes. The exercise of good judgment in prescribing lenses is the factor that differentiates routine fitting of glasses from scientific refraction.

On the management of presbyopia I have written elsewhere. At this time I would simply direct your attention to the fact that frequently incipient presbyopia is but a manifestation of latent hyperopia. A drop of homatropin will clear up the matter.

I shall not detain you to enumerate and discuss the various forms of muscle imbalance and their treatment. Of this I have also written elsewhere. There is one form of imbalance, however, to which I would like to direct your attention. For many years I have been greatly interested in studying a condition that for lack of a better name I have called sublatent or delayed hyperphoria. By these terms I mean an imbalance of the superior and inferior recti muscles, that is not detected by the ordinary methods of testing. My attention was really forced to this condition by a patient who suffered from a severe asthenopic complex, including a mild but troublesome conjunctivitis, which had resisted every effort for re-

lief. She was a strong, healthy married woman of 24 years of age, bringing a clean bill of health from her physician. Her eyes were normal, muscle balance normal. Vision without glasses = 20/20. She had been wearing +0.25 cyl. ax. 90°, both eyes for reading. With these glasses V. = 20/20+. Under atropin +0.50 ax. 90° V. = 20/15. At the postcycloplegic test she accepted this glass, and it was prescribed for constant use. Asthenopia somewhat improved, but she canot read for any length of time with comfort, and gets severe headaches when she goes to the theater.

It was at a subsequent visit when she was greatly fatigued and was suffering from a severe headache, that I retested her muscular balance, finding it, as I had previously, normal. With the Maddox rod in the vertical position before her right eye, she had been sitting about ten minutes discussing her symptoms, when she remarked that the line had fallen below the light. A 1° prism corrected the imbalance. Repeated tests under similar conditions gave identical results. Moreover, the correction was attended by comfort and slightly improved visual acuity. Use of correcting cylindroprisms cured the asthenopia.

An interesting sequel in this case was that while visiting her people in New York, her father took her to his oculist to satisfy himself that everything was right. She informed the oculist that I had prescribed prisms, but after examining her he said that her muscles were normal and prescribed +0.50 ax. 90° for both eyes. In two weeks the asthenopia had returned, and it persisted until the cylindroprisms were replaced.

Since I had this experience, whenever I come across a baffling case of asthenopia I look for "sublatent" hyperphoria, and in a number of instances I have been fortunate enough to give relief to patients who had been for many years the victims of persistent asthenopia. In some cases, the amount of hyperphoria was so small that it seemed negligible, but when glasses correcting the ametropia have been worn for some time and the muscular imbalance persists, I do not hesitate to prescribe a prism of ¼ degree.

About cyclophoria I have little to say. The clinical data that I have been able to gather are so meager that I have been unable to arrive at any definite opinion on the subject. I do not own a clinoscope. In my office I use a horizontal line viewed thru a double prism; and if I find plus or minus cyclophoria, I bear it in mind in placing the axis of the cylinder, when the abnormal meridian is close enough to the principal meridians to induce the patient to rotate the eyes to make the images coalesce.

In conclusion, I would say that as I see it, refraction is at once the most difficult and fascinating branch of our specialty. What it has done for humanity since the days of Donders is well known to you all. Why it has been in some quarters relegated to a position of minor importance is difficult to understand. It is true that for the student the refracting room lacks the alluring thrills of the operating amphitheater. But if he is wise, he will devote himself to the mastering of the basic principles of refraction, and thus lay the foundation for success in what will subsequently constitute the major part of his professional work.

15 E. Washington St.

NOTES, CASES, INSTRUMENTS

CATARACT OPERATION IN THE PRESENCE OF ACTIVE DIABETES.

CLARENCE LOEB, A. M., M. D.

CHICAGO, ILL.

The occasion for this report is a paper by Dr. W. R. Parker, published in the April number of the JOURNAL. He says: "If patients are made as nearly sugar free as possible before the operation, I have noted no difference in the healing process of the corneal wound in the diabetic cataract, from that seen in cases of uncomplicated senile cataract." In this connection, the following case may be of interest:

Mrs. L. D., colored, consulted me Nov. 24, 1924, for bilateral cataract, right mature, left almost mature. V. O. U. = hand movements; projection, good. Externally, there was a mild chronic conjunctivitis.

She stated that she had been under the care of Dr. T. for diabetes, but had recently been discharged as cured. A telephonic conversation with Dr. T. confirmed this, so the patient was put on treatment to clear up the conjunctivitis. The right eye was operated Dec. 5, 1924, without untoward incidents. Thru some mistake, the urinalysis was not available before the operation, and I did not get to see it until the patient was back in bed. To my dismay, I then saw a record of 2% sugar in the urine. She was immediately put on antidiabetic treatment, including the use of insulin. The corneal wound was slow in healing, and this was complicated by the fact that the patient accidentally struck her eye one night, which was followed by a prolapse of the iris. It was subsequently necessary to excise this, after which the wound normally progressed to healing. There was at no time any indication of iritis. Owing to an incarceration of the edges of the iridectomy wound, the lower margin of the pupil is slightly higher than normal. However, with +9.0⌒+1.0 cyl. ax. 180, V. = 6/6—2, and with +4.0 sph. added to the above, she reads Jäger 1.

This case would seem to show that the presence of glycosuria is not necessarily a contraindication against cataract operation, provided the patient is in good condition otherwise, and is treated for the diabetes during the after treatment for the cataract.

BILATERAL VOSSIUS RING OPACITY.

WILLIAM C. FINNOFF, M.D.

and

DONALD H. O'ROURKE, M.D.

DENVER, COLORADO.

In the September number, 1924, of the American Journal of Ophthalmology, Dr. William Zentmayer reported a case in which a typical Vossius ring was seen on the anterior capsule of the lens following an operative hemorrhage into the anterior chamber. He concluded that Vossius rings may be due to staining of the anterior lens capsule by blood pigments, the explanation advanced by Hesse.

The following case history substantiates Hesse's hypothesis:

E. E., male, age 9 years, was playing with a dynamite cap, which exploded and inflicted multiple wounds of the face, head and upper extremities. One hour later ocular examination revealed a minute perforating injury in the sclera of the right eye, just above the cornea. The sclera of the left eye was penetrated 4 mm. above the limbus. Both wounds were 2 mm. to the right of the vertical meridian, and the anterior chambers were filled with blood. At the second examination, 24 hours later, the right eye was unchanged. In the left the blood had absorbed considerably, and the upper part of the iris and pupil was visible. A distinct Vossius ring was seen on the anterior capsule of the lens. Seventy-two hours after the injury the right anterior chamber had cleared and a similar Vossius ring was present.

The rings were symmetric and about 3 mm. in diameter, the only difference being that the right was more dense; and

it is interesting to note that in this eye the hemorrhage was greater and persisted for a longer period of time. With the point of light and corneal microscope, the following details were noted: A disc consisting of minute reddish-brown granules so distributed that a distinct circular band formed an outer boundary, which enclosed a thinner deposit of similar granules. The uveal pigment at the pupillary margin of the iris was intact. With the ophthalmoscope the ring was distinctly seen and the central disc was hardly visible.

Nine days after the injury the pigment had disappeared from the anterior capsule of the left eye; and on the eleventh day from the right.

In a series of experiments on twelve rabbits (24 eyes), we produced hemorrhages into the anterior chamber by traumatizing the base of the iris and ciliary body with a Ziegler knife needle. Pigmentation of the anterior capsule of the lens occurred in but one eye, and only formed an incomplete ring in the pupillary area. However, in our experiments, even with severe trauma, we were unable to produce as extensive hemorrhages into the anterior chamber as were observed in the case above reported.

217 Imperial Bldg.

FOREIGN BODY IN THE IRIS.

A. A. Burke, M.D.

NORFOLK, VA.

History: 8/14/24. H. H., aet 26. Seven days ago, while driving a chisel, a piece of steel flew off, which struck him in the left eye, causing only a moment's pain. Nothing more was thought about the piece of steel striking him in the eye until that night, when the eye began to pain. The next morning he consulted a specialist who, after examining the eye, told him he had iritis. Two days after the eye was injured, an X-ray picture was taken and reported negative.

Physical Findings. Left eye vision equaled 20/40. Lids healthy, conjunctiva slightly injected, cornea clear save for a very small opacity. The iris is dilated, which dilatation is due to atropin having previously been instilled into the eye. The lens and vitreous are clear. Choroid, retina and optic nerve healthy. At the lower quadrant of the anterior chamber of the left eye, a minute elevation of the iris can be seen. This elevation is about half the size of the head of a small, straight pin. Notwithstanding the fact that the X-ray was negative (the picture was taken by a competent Roentgenologist), I felt confident that there was a small foreign body in the iris, covered over by exudation. My next procedure was to place the eye immediately in front of the giant mag-

Fig. 1.—Size of foreign body (2) as compared with dime (1) and pinhead (3).

net, and when I did so, the patient complained of some pain in the eye, and the iris was seen to bulge slightly forward. Having confirmed my suspicion, I then made an incision in the cornea, similar to the one that is made for extraction of a cataract, only much smaller, and the piece of steel was withdrawn by the magnet.

8/15/24. Patient returned, and the eye was in fair condition.

8/25/24. Patient returned, after having remained away for about ten days without instruction to do so. The eye was in first class condition. Vision equaled 20/40.

It was my intention to follow this case closely, to see whether there was any refractive error, causing impairment of vision, but the patient has failed to return for an examination.

The interesting points about this case are: First, the piece of steel penetrated the interior of the eye, causing practically no inconvenience, and no thought to the patient that anything was in it. This particular point is nothing new to those of us who have had opportunities to observe this class of injuries, but it is especially brought

out in this case. The other point of interest is that we should not think of the X-ray, or laboratory findings as the last word in any eye case. We, of course, must still look upon them as wonderful aids, not losing sight of the fact that the X-ray and laboratory are not infallible.

In the picture which is presented, a dime (number one), the head of a pin (number three), and the piece of steel (number two), which was removed, are shown. The piece of steel is in the middle, the dime and the pinhead being shown so that a comparison of the size of the steel can be readily made.

Medical Arts Bldg.

SOCIETY PROCEEDINGS

ROYAL SOCIETY OF MEDICINE.

Section of Ophthalmology.

FEBRUARY 13th.

PRESIDENT, SIR ARNOLD LAWSON.

Sir Anderson Critchett.

THE PRESIDENT made sympathetic reference to the recent death of Sir George Anderson Critchett, remarking that ophthalmology in general, and this Section in particular, had sustained thereby a loss which it would be very difficult to make good. During a long and distinguished career, Sir Anderson had filled every post in his own specialty which could have been offered to him, including those of President of this Section, of the Section of Ophthalmology in the International Congress of Medicine in 1913, and the Mastership of the Oxford Ophthalmological Congress the last named post being still in his occupation at his death. He was always a most courteous and dependable colleague, while among those who had his friendship he engendered real affection. Sir Arnold proposed a vote of condolence to his widow and family, and this was seconded by his friend of forty years, Mr. Ernest Clarke, who averred that the profession would never see a finer gentleman.

The resolution was carried in silence, members rising in their places.

Recovery from Pseudotumor of Orbit.

MR. LINDSAY REA first brought this patient to the Section in June last, when both eyes were proptosed, the lids would not meet, and the corneae had to be protected by a thin smear of paraffin applied two or three times daily, in consequence of which no ulceration occurred. The sinuses were examined, and one of them yielded mucus. The left antrum, left orbit, ethmoid and right orbit were all affected. Fibrosis had not occurred. N. A. B. was given in .45 of a gram doses, with mercury inunction and the administration of iodid of potassium for three months. At the end of that time, the left eye, which had been blind, recovered 6/6 vision, and the other eye now had similar vision. All that remained now to be done was to tie up the external rectus, which had been cut at an early stage, before the Wassermann reaction was known, in the effort to find the swelling.

Optic Nerve Tumor.

MR. HUMPHREY NEAME brought up a man with a tumor of the optic nerve, with the object of obtaining opinions as to diagnosis and treatment. The patient's age was 45, and the family doctor noticed in 1918 that one eye was more prominent than its fellow. During the subsequent six years the proptosis had gradually increased, and it was now 7 mm., and in the proptosed eye vision was now only perception of light; there was practically no lateral displacement or rotation. The left eye was hypermetropic 6 D, the right 1 D. Lenses did not improve the vision of the left eye. The left disc showed a prominence of 4 D above the surrounding structures at 5 disc diameters away, the disc seeming to be the summit of a convexity which was pushing into the eyeball, i.e., it gave the suggestion of something being pushed forwards from behind. Wassermann 18 months ago and now was negative, and

no disease of nose or sinuses could be detected. Still, the man had had iodids for 18 months. As to the nature of the tumor, the man's age was in favor of the growth being endothelioma. In a paper by Mr. Hudson in the Royal London Ophthalmic Hospital Reports, 75% of cases of gliomatosis were said to have been in the first decade of life, and of the cases of endothelioma 50% were over 30 years of age. In gliomatosis visual defect was usually early, proptosis coming on at a later stage. In endothelioma there was generally more limitation of movement than in the other varieties, but in this case the tumor might be far back. Pain was more common in endothelioma, and it was a symptom in this man.

Discussion. MR. LESLIE PATON reminded the Section of the case he showed at a clinical meeting of the Section last year having a very similar appearance. From that patient he subsequently removed an intradural tumor of the size of a sparrow egg, and it was a myxoglioma. Subsequently the lids of the patient (a child aged 4) had to be sewn together on account of neuropathic keratitis. Recently there was a recurrence of the growth.

Orbital Tumor.

MR. F. A. WILLIAMSON-NOBLE also showed a case of optic nerve tumor. He said he had since come to the conclusion that it was probably an inflammatory mass in the orbit. The patient, a woman aged 63, noticed proptosis two years ago. Since October last she had been taking iodids, and the proptosis seemed to have become less in that time. An elder sister had cancer of the breast, and a younger sister had malignant disease of the eye. Wassermann and X-ray examination were negative. The blood showed a leucocytosis of 11,000, and the eosinophils were 5%. Inflammatory tissue appeared to be pushing the eye forward.

Angioma of Retina.

MR. KENDALL showed a man who noticed defective vision in the right eye in 1918. Vision in that eye was now found to be 6/60 with a minus 3 spherical, and the vision in the left eye was also 6/60, not improved with glasses. There had been no accident. The upper temporal artery on the disc was double the normal diameter, and the diameter was increased as it coursed towards the periphery. The companion vein was also very greatly dilated. The lower temporal and nasal veins were also much enlarged, tho their corresponding arteries showed little departure from the normal. There were several small recent hemorrhages. In 1924 the vision in the right eye with glasses, was 6/12. In the left there was not even perception of light, the eye was divergent, there was a complete detachment of the retina, with large scintillating crystals at the back of the retina.

Etiology of Miners' Nystagmus.

DR. T. L. LLEWELLYN opened with a general review of the subject, remarking that it was an occupational disease of the general nervous system, of gradual onset, and chiefly seen in workers at the coal face. He did not regard it as a local disease confined to the ocular muscles. His view received support from the fact that these men had headache and giddiness, and in the severer cases, marked anxiety, mental depression, and disturbing dreams, as well as head tremor. Twenty-five per cent of all men employed underground who were examined showed signs of the disease. Since the adoption of a more generous definition of the term, the applications for compensation under the Government scheme had risen steadily. In 1923 the cost of compensation in all industrial diseases was £600,000. The worker at the coal face was a highly skilled laborer, who had to make his blows with precision, but in a very poor light.

Dr Llewellyn said he considered that the chief factor in the production of the disease was the deficient illumination of the coal mine, due both to the low candle power of the lamps used by the men, and to the great absorption by the coal of what light there was. Frequent symptoms were a delay in dark adaptation and an increased

retinal susceptibility. The condition was more prevalent in Winter than at other seasons, the symptoms came on after dark, and the recovery rate was greatest in Summer. The age of the worker, the character of the shale, and the amount of attention he paid to his disease, were all important factors in causation.

Certainly the personal element was an important one, for men having an illness or sustaining an accident, such as to the leg, frequently attributed their condition to the nystagmus which they had endured without complaint for years. Three classes of cases were seen: those showing no neurosis, those with the disease well marked and with definite neurotic symptoms, and those with slight or indefinite nystagmus in whom the dominant symptoms were neurotic. Both the rate of incidence and the recovery rate were improved by subjects of the disease working at suitable employment; idleness caused such deterioration as to render the subjects unemployable. He showed a number of instructive slides by means of the epidiascope.

Professor J. S. Haldane said it was now clear that miners' nystagmus was brought about by using the eyes for the guidance of muscular movement, when the absolute differences in the luminosity of objects seen was very low indeed. The latter might be so extreme as to prevent a distinction between white and black objects, however large. In foveal vision, with sufficient luminosity, the impression of consciousness with an eye fixed on the object was a lasting one. But with very low luminosity foveal vision lost its lasting character. When the eye could not be fixed on an object, the eye wandered about, and the result of momentary fixation and endeavoring to pick it up again was a fatigue, which ultimately led to nystagmus. The disease did not occur where the men used oil cap lamps. The illumination required to prevent nystagmus was that which allowed lasting foveal vision and therefore permitted objects to be fixed with the eyes. He did not consider that nystagmus was due to the gases present in coal mines.

Mr. H. S. Elworthy (Ebbw Vale) said that when making his investigations he was much impressed with the blackness of the coal mines, and he thought that could be best improved by introducing colors into the mines. He explained that by "better illumination" he did not necessarily mean greater candle power. He believed there would be no nystagmus if the chromophotic index was over 500. When an oil lamp was taken into a mine, the yellow and orange rays seemed to disappear, thus seriously reducing the illumination. Those rays reappeared when the lamp was again brought into the fresh air. The eyes needed to be protected from ultraviolet rays, and exhaustion of the visual purple by those rays might explain the eye movements in nystagmus. Steam coal was found to reflect twice as much blue light as did house or anthracite coal, and nystagmus was much the most frequent among workers dealing with anthracite coal at the face. He thought the carbon filament lamp could be regarded as ideal, it produced an excellent light for the purpose. In order to be within the margin of safety from this point of view, a light of at least 0.9 of a candle power was needed. Among 4,600 men working underground in the Ebbw Vale group, there were 42 cases of nystagmus in 1914, but in 1924 there were only 7 cases. In the interval, the only change in equipment for the men was the provision of a yellow glass instead of clear crystal. At the present time, with the weekly compensation figure at 35 shillings, it paid a miner better to claim this than to work for three days a week where the economic conditions were bad.

Professor E. L. Collis, who illustrated his remarks with diagrams, pointed out that the supposed increase in nystagmus was apparent rather than real. An increase in compensation claims had occurred, due to the disease being an occupational neurosis, in other words, a complex of a physical symptom and an underlying neurasthenia. Oscillation of the eyeballs was present in from 20% to 30% of miners working in poor illumination,

without causing them inconvenience. In Belgium, the longest time a miner could draw compensation allowance was six months for this condition, whereas in this country there was no limit of time. When it was provided that the compensation could be claimed on neurasthenic symptoms alone, i.e., without oscillation of the eyeballs, the number of claims rose, particularly claims from those who had had the disease for some time. There was good evidence to show that the increase in the claims was due to economic factors. Professor Collis considered that the important matter today was not nystagmus proper, but neurasthenia.

Mr. Binns spoke from the standpoint of colliery owners' insurance, and said many cases certified as nystagmus were not so in fact, due to the fact that not all surgeons brought into relation with these cases were experts on it. Of 428 claims for the compensation, 32 were appealed against, and in 28 of those the appeal was sustained. He believed that canary colored glasses had been found very useful.

Mr. G. H. Pooley (Sheffield) confined his remarks to the personal factor in the disease, and this he divided into the personality of the observer, and that of the person observed. The incidence of the disease could only rightly be ascertained by examining all the men working in a particular mine, and, if possible, under actual conditions in which they were working. He had recently been investigating the effects of using light of 0.00006 of a candle power, and found that with this the normal eye could detect color. A relative central scotoma was experienced. There was a point on the temporal side at which the visual acuity was greater than at the fixation point. Under these conditions there was much flickering and a sense of fatigue, and a moving object was seen more readily than a stationary one. When working in a very dim light it was very difficult to prevent the eyes oscillating. Some men with undoubted nystagmus played cricket, and in quite good teams, and refused to apply for benefit. Mr. Pooley thought that much of the so-called hysteria, met with in connection with the disease, was really *malade imaginaire*.

Dr. F. Robson said the class of coal in connection with which most cases of nystagmus arose was the bituminous, and this contained a high percentage of volatile matter. Subjects of nystagmus might recover from it, but their return to the pit working was marked by a recurrence. There was no nystagmus in diamond, copper, tin and other kinds of mines, whatever the depth of the workings, and whatever lamps were used. Neither was the disease met with in the coal mines of America and South Africa, but in those of New South Wales this disease and "pink eye" were very prevalent. There, also, there was a great tendency to spontaneous combustion.

Dr. Mllais Cuplin said that nystagmus, as such, did not disable a man, and that the symptoms associated with the nystagmus were psychoneurotic. He thought there was a close and suggestive association between the neuroses in this relation and those of socalled "shell shock" during and following the war. This view was supported by Dr. C. F. Harford and Dr. H. D. Eddison.

Mr. H. E. Mitton, a civil engineer with 7,000 men under his supervision, who had spent all his life among miners, said he was satisfied that nystagmus was due to the strain of working in insufficient light, and that there were great differences in response among different men. The process of "holing" increased the liability to the disease, owing to the miner's difficulty in getting light thrown on to the point he wished to strike. This resulted in eyestrain. In his area, there had been an improvement in the incidence of miners' nystagmus from .95% in the year 1913, to .56% in 1924, due, he considered, to improved illumination. He was firmly of opinion that when a miner found himself suffering from nystagmus, he would be wise to continue exercise in some capacity, for extra smoking and comparative inactivity increased the symptoms and inconvenience of the disease. H. Dickinson, Reporter.

MEMPHIS SOCIETY OF OPHTHALMOLOGY AND OTO-LARYNGOLOGY.

February 10, 1925.

Epithelioma of the Lacrimal Sac.

Dr. Robin Harris presented a woman, aged 34, whom he had first seen in December, 1920, with redness, swelling, and a discharging sinus over the region of the left lacrimal sac. The condition was of gradual onset, and had been present for three years. The blood Wassermann was negative, and the condition was thought to be blastomycosis. Dr. Hall made a diagnosis of epithelioma and treated the condition with X-ray. It healed, but a little pus can sometimes be expressed from the sac. The lacrimal nasal duct is closed. The removal of the sac from the nose was proposed as giving a better chance to use radium.

Discussion: Dr. Ellett asked if a microscopic examination was made of the growth; and said that he had seen lacrimal fistulae with a corona of granulation tissue around them, that gave an appearance so similar to epithelioma as to deceive men of experience. He recalled one case treated by X-ray without result, and cured by treatment of the lacrimal obstruction. The cases of epithelioma of the lacrimal sac, with which he was familiar, did not present any external signs except those commonly seen in chronic dacryocystitis, that is, swelling. The depth of the sac, so apparent in operating on the sac, makes it unlikely that a superficial epithelioma would involve the sac at all.

Dr. J. B. Stanford called attention to the fact that X-ray treatment about the eye will often cause a stricture of the duct where none was present before.

Dr. E. R. Hall said that Dr. Harris referred the case to him in 1923 with a lesion near the inner canthus of the left eye. In the center there was a sinus or necrotic area discharging a small amount of pus, the edges were elevated, having a rolled appearance, and this new growth extended downward one-half to three-fourths of an inch. Syphilis as well as epithelioma must always be thought of in this locality. The first Wassermann was 2 plus and the next test was negative. There being no clinical signs or history of syphilis the 2 plus was disregarded.

Altho no section was made, a clinical diagnosis of epithelioma of the skin with secondary pus infection of the lacrimal sac was made. The condition that Dr. Ellett spoke of often resembles an epithelioma. In this case the new growth was more extensive, and the epitheliomatous tissue was not confined to the area surrounding the sinus. The case was treated with radium and X-ray with very good results. The scar along the side of the nose gives an idea as to the extent of the new growth.

Injury of Both Eyes by Explosive.

Dr. P. M. Lewis showed a boy, aged 9, who on January the 28th, held a shot gun shell in the fire, when it exploded, blowing off several fingers of the right hand and injuring both eyes, face and neck. When seen the next day there was much photophobia and inflammation, with several foreign bodies in each cornea, a perforating wound of the right cornea with an apparent prolapse of iris, and hemorrhage in the anterior chamber, and infection of the left eye, as shown by the anterior chamber being full of pus. X-ray showed several small foreign bodies in the anterior segment of each eye. Vision P. L. Under general anesthesia the right eye was cleaned up, and what appeared to be prolapsed iris was found to be exudate and debris from the shell. This was removed and the iris freed from the wound. The lens was found to be cloudy and several grains of powder were seen in the cornea, but could not be removed. The left eye was let alone as it had light perception and panophthalmitis had not developed. The left eye is now shrinking and the right shows iridocyclitis. It is proposed to remove the left eye.

Discussion. Dr. J. B. Blue and Dr. D. H. Anthony thought the eye should be removed.

Entropion and Trichiasis.

Dr. A. C. Lewis showed a man, aged 43, with a history of sore eyes all of his life. The right eye is the better and

has good vision, but there is a mild degree of entropion and narrowing of the palpebral fissure. The left eye shows marked lid deformity, the whole margin of the upper lid being inverted, and all the lashes rub on the cornea. The lower lid margin is slightly inverted and the palpebral fissure greatly narrowed. The cornea is quite opaque and the conjunctiva of both eyes shows scars of trachoma.

Cicatricial Entropion.

DR. E. C. ELLETT showed a patient upon whom he had operated the previous day for cicatricial entropion. Mrs. H., aged 54, right eye blind from iridocyclitis and secondary glaucoma. Left eye shows signs of healed trachoma and entropion of the upper lid. The operation was that devised by Dr. John Green, and consists in making an incision thru the tarsus 3 mm. above the edge of the lid and parallel with it. A strip of skin is then excised about 4 mm. wide, clear across the width of the upper lid. Three or four sutures are so placed as to evert the lid border and close the skin wound. This is a simple operation and usually gives good results. On a previous occasion Dr. Ellett had presented to the Society a patient, upon whom he had performed this operation 22 years before, and the result was entirely satisfactory and permanent.

Discussion: DR. W. L. SIMPSON expressed warm admiration for Beard's "altogether operation" and especially for the mucous graft. It is very necessary to make the incision deep, that is to hold the graft, so it will gape considerably and give a sufficient bed to hold the graft firmly. He further secures it by one or two sutures, not passed thru the graft, but from one lip of the incision to the other, crossing and holding down the graft. He succeeds in retaining the majority of the grafts, and emphasized the fact that an immediate overcorrection is necessary to get good results.

DR. J. WILSON RAMSEY also spoke favorably of the Beard operation, which he learned from Dr. Beard while House Surgeon at the Illinois Eye and Ear Infirmary. By observation of the points made by Dr. Simpson he is sure that the large majority of the grafts are retained, tho he had heard it informally stated at this meeting that ninety per cent of them did not take.

Optical Principles of Slit Lamp.

DR. E. C. ELLETT gave a short talk on the Slit Lamp with a description of the optical principles involved in the instrument and its use. The perfected illumination has greatly enlarged the usefulness of the corneal microscope, and features in the cornea, iris, anterior chamber and, to a less extent, in the lens and vitreous, are more easily studied. The method being yet comparatively new, there are many things to be seen whose exact clinical significance is not well understood.

COLORADO OPHTHALMOLOGICAL SOCIETY.

FEBRUARY 21, 1925.

DR. G. L. STRADER, presiding.

Magnet Extraction: Retinal Detachment.

E. E. MCKEOWN, Denver, presented a man whose eye had on November 25, 1924, been penetrated by a small piece of steel, which had been extracted with the hand magnet thru a scleral incision several weeks later, two days after an unsuccessful attempt. At first there had been very satisfactory clearing of vision to 16/25. But two months later the patient came in with vision of this eye reduced to 16/70, fluid vitreous, and a retinal detachment.

Discussion. W. C. FINNOFF, Denver. I think this retina is detached on most of the temporal side.

W. H. CRISP, Denver, mentioned a recent case of cataract extraction in an eye with simple glaucoma, in which a small retinal detachment had appeared on the nasal side, a week or two after operation. The retina had become entirely reattached after about a week.

J. A. PATTERSON, Colorado Springs. I think you are more apt to get detachment if you remove the foreign body quickly.

J. M. SHIELDS, Denver, raised the question how soon after injury, or after operation, detachment of the retina was most likely to occur.

DR. CRISP thought there was no time limit for the occurrence of detachment in such a case of injury or operation.

C. E. WALKER, Denver. The foreign body and the act of removing it produce so much damage to the eye, that the patient should be kept as quiet as possible. I would have the patient stay in the hospital, sometimes as long as three weeks. Even then he should not return to work at once.

W. C. BANE, Denver, thought there was more risk of traumatism with the giant magnet than with the hand magnet.

DR. PATTERSON questioned whether the foreign body could have been extracted with the small magnet, in this case, as he thought some bodies were too minute for the hand magnet.

DR. FINNOFF. In view of the danger of detachment, all these cases should be given a very guarded prognosis. In the presence of a band of scar tissue, the eye may not have a detachment for a good many years, and yet this complication may come finally, as a result of the constant pull of the act of accommodation. I saw detachment occur four years after a slight perforating injury, about six mm. back of the limbus.

Spontaneous Absorption of Cataract. Focal Infection.

D. A. STRICKLER, Denver, presented a man, aged 38 years, whose right eye had recently shown gradual absorption of a cataract which had developed some years earlier, and whose left eye had, during the last two months, developed a disturbance of vision in association with vitreous opacities. Diseased tonsils had been removed and several dental infections had been taken care of; beside which an autogenous vaccine, made from a pure culture of streptococcus viridans derived from the left tonsil, had been administered. The vision of the left eye had for a time improved, but more recently had again fallen to 20/40. It was proposed to do a submucous resection and exenteration of the ethmoids.

Discussion. C. E. WALKER, Denver. This looks like a case of choroiditis, and I do not think that any operation would at this time be advisable.

Optic Atrophy. Previous Abducens Paralysis.

D. A. STRICKLER, Denver, presented a man, aged 42 years, who six years previously had had partial paralysis of the left external rectus muscle, from which he had approximately recovered in about nine days. The patient had in the meantime been under antisyphilitic treatment. He had returned recently on account of dimness of vision, which had been coming on for eight or nine months. The vision was R 20/200; L., 20/50 with correction There was atrophy of each optic nerve with decidedly contracted fields. The Wassermann was now negative. The tonsils were badly diseased, and the condition of some of the nasal sinuses suspicious.

Discussion. E. B. SWERDFEGER, Denver, showed and explained some X-ray negatives of the sinuses in this case.

J. A. PATTERSON, Colorado Springs, referred to a recent case, with swollen optic nerve and a history of syphilis two years previously, but two negative Wassermann tests. The optic foramina were both within normal size.

W. H. CRISP, Denver, was impressed with the possibility that syphilis was still the active cause of the trouble in Dr. Strickler's case, in spite of the negative Wassermanns.

Buphthalmos.

C. E. SIDWELL, Longmont, presented a boy, aged eleven years, whose right eye was extremely buphthalmic, the cornea being ectatic thruout. The lens was cataractous. The vision of the left eye was 20/100. The condition was thought by the parents to have started at the age of two weeks. The patient was one of twelve children, one of which had died at birth, and four others at ages varying from six days to five years.

Discussion. W. C. FINNOFF, Denver. suggested removal of the buphthalmic eye.

J. M. SHIELDS, Denver, suggested an operation to relieve the tension of this eye.

W. H. CRISP, Denver, thought there might have been a slight specific interstitial keratitis in the left eye.

G. F. LIBBY, Denver, suggested that there might be a tuberculous element in the case.

Amaurotic Family Idiocy.

W. C. FINNOFF, Denver, presented a typical case of amaurotic family idiocy, in a girl aged fourteen months. The child had been healthy until four months of age, when the parents had first noticed that she did not fix on bright objects. She had never sat up and there was a general muscular weakness. So far as could be discovered there was no Jewish blood in the family. This was the first child. Ophthalmoscopically the picture was characteristic, with a cherry red spot at the center of the macula, surrounded with zone of pale retina. An interesting, incidental feature of the case was that a Denver pediatrician had brought in the patient for confirmation of his diagnosis, having seen the cherry red spot in the macula. These cases were due to degeneration of the ganglion cells. The cells in the macular region, being more highly specialized, probably degenerated first. The muscular weakness was probably due to degeneration of the ganglion cells in the region controlling the muscles.

Temporal Hemianopsia.

W. C. FINNOFF, Denver, presented a young man, aged nineteen years, whose vision had been failing since the middle of the previous year, first in the right and then in the left eye. There had been occasional headaches and occasional attacks of vomiting, not of a projectile character. On February 2, 1925, the right eye was blind, vision of the left eye, 0.2 eccentrically to the right and unimproved with lenses. The right disc was slightly paler than normal and with red free light the nerve fibers were not so pronounced as in the left eye. The left fundus was normal. The left visual field showed complete temporal hemianopsia, with slight encroachment on the nasal side above. X-ray reports failed to indicate disease in the nasal accessory sinuses, but the sella turcica showed a shallow bed and very large processes, the anterior and posterior apparently meeting. Wassermann was negative. Eight days after drainage of the ethmoids and opening of the sphenoidal sinus, on February 8, the vision of the left eye had improved to 0.3 and a bright light was detected with the right eye, but no further improvement had taken place. It was thought probable that the underlying cause was pressure on the chiasm.

Discussion. W. H. CRISP, Denver. The outlook in these cases it at best none too good. In some cases very definite improvement has been reported from the use of deep X-ray treatment. This was suggested to the patient in an advanced case of hypophyseal tumor seen by this society at its summer meeting in 1923. But the patient disappeared, and I recently heard that he was operated upon at the Mayo clinic, where it was found impossible to interfere with a large soft tumor which was present.

Syphilitic Ulcer of Eyelid.

D. H. O'ROURKE, Denver, presented a man, aged 29 years, who in the course of the previous ten weeks had developed an indurated ulcer involving the outer two-thirds of the margin of the right upper lid. Smears were negative. The preauricular, submaxillary, and cervical glands on the affected side were enlarged. Scrapings from the ulcer had been injected intraperitoneally into a guinea pig. Improvement had followed thru swabbing of the ulcer with concentrated lactic acid, but there had been more marked improvement since the use of mercury inunctions and of a solution of potassium iodid.

Discussion. W. C. FINNOFF, Denver. said that the condition might be tuberculosis, syphilis, or Parinaud's conjunctivitis. The diagnosis was not entirely certain.

Optic Atrophy After Papilledema.

D. H. O'ROURKE, Denver, presented a man who was suffering from advanced pulmonary tuberculosis, and whose vision had failed rapidly in September, 1923, in association with

severe frontal headaches and projectile vomiting. After that time there had been a bilateral papilledema of two diopters, with slight contraction of the arteries and marked dilatation of the veins, which were very tortuous. Two weeks later the papilledema had increased, and the patient was semicomatose, the general basis of the condition being considered to be a tuberculous meningitis. But rather more than two years later, in February, 1925, the patient had walked into the clinic with bilateral optic atrophy. The picture was that of simple atrophy. A blood Wassermann had been negative.

Discussion. W. A. SEDWICK, Denver, thought the man had had acute syphilis.

G. F. LIBBY, Denver, asked whether there were any signs of tabes in the case.

W. C. FINNOFF, Denver. There were tubercle bacilli in the sputum. The Wassermann was negative and the patient had not had any treatment. When he came in he had a marked papilledema. The atrophy is due to pressure of the edema on the nerve fibers.

DR. LIBBY. If this case was one of tuberculous meningitis it is the first I have ever known to recover. In my mind there is a pretty strong leaning toward the idea that the case is specific.

W. H. CRISP, Denver, suggested the possibility that the case was an unusual one of lethargic encephalitis.

Central Choroiditis.

W. C. BANE, Denver, presented a man, aged 54 years, whose vision had been failing since 1909 and was now R., 2/60; L., 2/60. The nose had been broken in 1905, but there had been no evidence of failure of vision until four years later. There were decided central scotomata. Ophthalmoscopic examination disclosed in the macular region of each eye a mottled, approximately circular area three disc diameters across, in which the retinal pigment was completely absorbed. There were irregular pigment deposits in these areas, and some cholesterin deposits over the macula. On the side of each area, toward the disc, there was a narrow strip in which the pigment was less completely absorbed. The Wassermann test was negative. Correction of compound myopic astigmatism gave vision of R. and L., 5/60.

Discussion. W. H. CRISP, Denver, suggested a degeneration on the basis of a profound systemic disease like syphilis, either in the ancestry or very early in the patient's own career.

W. C. FINNOFF, Denver, referred to the class of abiotrophies, a term applied by Treacher Collins to a variety of degenerations probably due to deficiencies in the germ plasm.

Penetrating Injury.

W. C. BANE, Denver, showed an automobile mechanic whose right eye had been injured by the end of a cotter key which the patient had cut off with a chisel. There was an angular cut in the cornea. The iris had also been cut but there was no prolapse. Healing had been smooth, without infection, but there was an anterior synechia, the lens was becoming cataractous, and the eye was quieting down rather slowly.

Discussion. The general view was that the case was being very well handled and should be left alone as regards surgical interference for some time to come.

Minute Excavations at the Macula.

C. O. EIGLER, Denver, presented a woman who showed in each eye at the center of the macula a minute, slightly depressed area of old retinochoroiditis.

WM. H. CRISP,
Secretary.

COLLEGE OF PHYSICIANS OF PHILADELPHIA.

SECTION ON OPHTHALMOLOGY.

JANUARY 15, 1925.

Sir Isaac Newton.

DR. BURTON CHANCE read a sketch of the life of Sir Isaac Newton, who harbored in his frail body, which at birth seemed too feeble to live out the

day yet survived eight-five years, a spirit of the greatest industry and inventiveness. His discoveries in the optical sciences and his expositions of the properties of light, laid the foundation of all later additions. And, to him, ophthalmology owes an inestimable debt; yet these greatnesses were only a small part of his general knowledge. Notwithstanding the laudation of his admirers, Newton's was not the greatest intellect bestowed on man; and he should not be regarded as an isolated phenomenon, but for whom the world would have been in darkness. In all his labors he was only following the spirit of his day, since other men were working along similar lines, and many of his problems are still unsolved. We can assent to the message contained in the inscription on his tomb in Westminster Abbey and "rejoice that there existed such and so great an ornament of human nature."

Discussion. Dr. S. Lewis Ziegler desired to record his hearty commendation of the fine historial work that Dr. Chance had presented before the Section. He had been doing similar research work and therefore realized the amount of labor required to assemble the events of the past in a readable form.

Bacterial Power of Aqueous, Saemisch Section.

Doctors E. M. Landis and H. F. Robertson (by invitation) said that, since in the Saemisch section the ulcerated surface is bathed by the aqueous, it was suggested that the beneficial effects usually observed after the operation might be due to a replacement of the normal aqueous by aqueous of second formation, on the hypothesis that the newly formed fluid contained antibodies not present in normal aqueous.

The problem involved the determination of the relative bactericidal powers of normal aqueous and aqueous of second formation, using for the tests staphylococcus albus and bacillus typhosus.

Previous work concerned itself chiefly with animals immunized to foreign erythrocytes, but in all accounts the aqueous of second formation contained greatly increased amounts of antibodies. The work of Vedder gives a slight suggestion of a similar increase in bactericidal power. By a table comparing the number of organisms alive after sixty minutes exposure to undiluted and diluted aqueous, by average curves, and by graphic means it was shown—first: normal aqueous possesses variable bactericidal powers against staphylococcus, which are markedly increased in aqueous of second formation, both undiluted and diluted; second: normal aqueous diluted one to ten has little bactericidal power against bacillus typhosus, secondary aqueous is markedly bactericidal.

Membrana Epipapillaris.

Dr. William Zentmayer presented a case of membrana epipapillaris seen in a man who visited the Wills Hospital because of a foreign body in the cornea. In the right eye there was a somewhat quadrate, veil like membrane covering the entire disc and also extending on to the retina to the nasal side. The papillary vessels and excavation could be indistinctly made out. A curious feature was the narrow hem which extended around three sides of the membrane.

The noncommittal term of membrana epipapillaris has been given to the various types of adventitious tissues seen at times upon the disc and upon the peripapillary area. They have been attributed to remains of the hyaloid structure and also considered to be the glial cells of the embryonal vitreous. Dimmer speaks of the similarity of the tissue to that of Kuhnt's central supporting meniscus.

Probable Extensive Remains of Cloquet's Canal.

Dr. Zentmayer also presented a case of probable remains of the hyaloid canal in the right eye of a child. Beginning at the point of emergence of the vessels from the disc and running upward over the disc and on to the retina, about 3dd. there was a sausage shaped, greenish white, somewhat prominent, mass which at this point became constricted and further on ter-

minated in a flaring brush. Running out from the point of constriction there was a cord like extension into the anterior part of the vitreous. There is a description of a similar condition by Dimmer, which he looked upon also as a remnant of the Cloquet canal.

Discussion. Dr. P. N. K. Schwenk showed a drawing which he made thirty-seven years ago for Dr. Charles A. Oliver, and reported in the Transactions of The American Ophthalmological Society Vol. IV, page 580, which showed a clubbed shaped body attached to the nervehead and extended outward to macula, where it was adherent. This undoubtedly was a shrunken remains of a hyaloid artery. The left eye had a nodule, with small fibers extending from it, floating in the vitreous.

Subconjunctival Injection of Adrenalin Chlorid.

Dr. G. Oram Ring read the paper published in full on page 553.

Discussion. Dr. S. Lewis Ziegler said that the subject of deep orbital injections of adrenalin and novocain was discussed by Fromaget before the French Ophthalmological Society in 1921-22. He noted that ten minutes after injection the scleral vessels contracted, the steamy cornea cleared up and the fundus again became visible. The tension dropped from 140 mm. to 60 mm. He proved this in certain cases by injecting adrenalin and novocain separately. He concluded that the local action of adrenalin on the ciliary vessels, the ciliary nerves and ophthalmic ganglion produced rapid vasoconstriction and ischemia of the choroid. Dr. Ziegler added his testimony as to the efficacy of this treatment in preparing almost hopeless cases for successful operation. But the tendency to a sudden hypertony must be watched and a posterior sclerotomy performed if the emergency demands it. He has adopted Galezowski's designation of sclerochoriotomy. He prefers to enter his knife and turn it at right angles on withdrawal, thus making a *T* incision, as suggested by Parinaud. He always makes a double puncture, locating one between the internal and inferior rectus and the other between the external and inferior rectus.

Dr. Ziegler recommended finger massage after the method of Dianoux as a helpful procedure in these cases.

Dr. Wm. Zentmayer said that this procedure is not without danger, as was shown in one of Dr. Gradle's own cases in which the physiologic effect of the drug was so marked that he incised the conjunctiva and washed out, so far as possible, the unabsorbed solution.

An interesting application of Dr. Knapp's socalled adrenalin test is that of Schoenberg who applied it to other members of a family in which a case of glaucoma had occurred, for the purpose of determining whether there was a glaucomatus tendency in the other members of the family. As he recalled, some positive results were obtained by him.

Dr. Ring in closing the discussion, called attention to the fact that in the one case of Dr. Gradle's series to which Dr. Zentmayer had referred, 8 minims of adrenalin solution had been injected subconjunctivally, whereas in his own cases, only 4 minims were utilized. He disclaimed any thought that the procedure, even tho followed promptly by posterior scleral puncture, could replace the usually recognized classical operations, but felt that in certain grave cases it could be utilized with definite advantage.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

November 17, 1924.

Dr. J. B. Loring, President.

Melanosarcoma of the Right Upper Lid.

Dr. F. G. Fox presented a case which had shown an affected upper lid of the right eye at the outer canthus since December, 1923. There was a polypoid mass there at that time; no pain; some tearing; no glandular enlargement. The mass had the characteristic bluish-black color. Operation had been advised but refused.

Coloboma of Optic Nerveheads.

DR. HENRY CHRISTIANSEN presented a case which had been tentatively diagnosed as coloboma of both nerveheads. The patient first noticed dimness of vision about six weeks previous. He consulted a general practitioner, who diagnosed glaucoma and sent the man to the Infirmary, where a diagnosis of congenital cupping of both discs was made. Laboratory tests, negative. Vision: R. E., 20/20; L. E., 20/25. Tension normal in both eyes; both fields contracted. A week later, patient stated he could read only 20/100 with the left eye. Vision was now R. E., 20/25; L. E., 20/200. It was suspected that he was malingering, and the malinger's chart proved conclusively that he could read as well with the left as with the right eye. A neurologist pronounced the case one of hysteria. Attention was called to the peculiar arrangement of the bloodvessels and the amyloid character of the protrusion on both nerveheads.

Refraction.

DR. E. J. GARDINER read a paper entitled "Refraction as I See It," published in full on page 557.

Discussion. DR. CASSIUS D. WESCOTT said that he wished to acknowledge his indebtedness to Dr. Gardiner, as one of those who first excited his interest in refraction, but he did not agree with Dr. Gardiner regarding the use of homatropin. He himself used atropin in all children and young adults, particularly in all cases where there had been difficulty in getting comfort in glasses, but preferred homatropin in most cases up to 55 years of age; a 2% solution of homatropin and cocain, a drop applied in each eye for four, five or six times at intervals of five minutes, commencing the tests an hour and a quarter after the first application. In cases where the patient was not positive about the axis of the cylinder and the amount of sphere varied from minute to minute, he put on a +3.00 sphere and tested the accommodation. If he found more than 1½ D., more homatropin was used, and another test made in half an hour, or the patient was instructed to return on the following day without using eserin, and the test was made again. He used eserin in the office before the patient left. He never made examinations without using drops of some sort, as he could not obtain satisfactory results with the ophthalmoscope without dilating the pupil, and did not want to overlook anything in the fundus or in the lens that was important. He always made a postcycloplegic test and absolutely refused to prescribe glasses after a single examination. He made no preliminary manifest refraction, no muscle test, until the postcycloplegic examination had been made, several days after the homatropin test—never twenty-four hours after. Duane took a week, and he himself was of the opinion that better results could sometimes have been obtained by a longer test. The accommodation of each eye was tested separately. He believed he had not given sufficient consideration to latent hyperphoria, and believed he would profit in this respect by Dr. Gardiner's suggestions. He knew Dr. Gardiner did not use the retinoscope, and noted that he had not mentioned it. In spite of the splendid assistants he had had, he regarded retinoscopy as only suggestive in many cases.

Concerning patients with immature but well advanced cataracts, who come for refraction, he thought they should be given the full benefit of what could be done with lenses. He had had a number of patients who had been told nothing could be done for them until they were totally blind, when they could be operated, for whom he had prescribed lenses which enabled them to see 20/50, and read the newspaper. Here the ophthalmometer had been of great help.

DR. C. W. HAWLEY said that he had used homatropin for thirty-three years, and had rarely been disappointed in the results. He stressed the importance of a correct retinoscopy, in connection with which he offered a suggestion borne out by his own experience. He had found while studying in London, that a man 52 years of age whom he tried to teach, could not do

a retinoscopy, tho he had no trouble with younger men. A man past 50 years of age must learn that he has lost his accommodation, and must add some sphere to the retinoscopic mirror. He found that by using plus 1.50 sphere he could do as good a retinoscopy today as twenty-five years ago.

Cataract Operations.

DR. HENRY T. HOLLAND read a paper, based on 1455 cataract operations done in six weeks, at Shikarpur, India.

Regarding end visual results, it was almost impossible to obtain reliable statistics, as most of the patients were never seen after they left the hospital.

The history obtained from the patient was generally absolutely untrustworthy. The glaucomatous cases particularly wilfully deceived the doctor, thus hoping to influence him in favor of operation; they deny pain, or any symptoms of glaucoma, and positively affirm they have perception of light. Others, who had the idea that the doctor would not operate unless the patient was completely blind, deny that they have perception of light and refuse to count fingers. The prevalence of trachoma and pyorrhea were two great difficulties to be contended with.

There were contraindications to Smith's operation, in the following cases of senile cataract: Glaucomatous cataract. In the stout plethoric type of individual, with a very projecting eyeball. When legitimate pressure fails to make the lens present.

His conclusions were: More cases of vitreous loss would occur in the intracapsular operation in the case of the average operator than in that by capsulotomy. Fewer postoperative complications followed the uncomplicated intracapsular operations, than that of capsulotomy. Slight vitreous loss, tho serious, is not so serious as iris prolapse. Whether expression by the Smith method, or expression by the capsulotomy method, or extraction by the Barraquer method is the best operation, will be settled by results obtained. The Smith technic or some of its modifications should be fully understood by any ophthalmic surgeon, before attempting the intracapsular operation, or even that of capsulotomy. To gain the necessary experience for cataract operating, the method recommended by Dr. Fisher, of operation of the eyes of kittens six weeks old, is suggested. The use of Dr. Fisher's needle is strongly recommended.

Discussion. DR. E. K. FINDLAY. Conditions in India had been so well described by Dr. Holland, that it could be readily understood how vastly different they were from those encountered in this country, and how operative procedure must be altered to suit those conditions. From his observations of cases operated by various surgeons using Smith's method at the Illinois Charitable Eye & Ear Infirmary, the results were not nearly so satisfactory by the intracapsular method; the postoperative inflammatory conditions were more pronounced and the decided failures more frequent. The good results were no better than those frequently obtained by the capsulotomy method; loss of vitreous and choroidal hemorrhages occurred more frequently where the sustaining posterior capsule was removed. The capsular method had seemed ideal where the cataract was immature; but unfortunately in those cases the zonule of Zinn was so strong, that undue and dangerous pressure was necessary to rupture it, so its advantages were more than counterbalanced. In a limited number of selected cases, the capsular method might be indicated, but in the large majority of cases the capsulotomy method was the safer and more reliable.

DR. HARRY E. WOODRUFF desired to place himself on record as believing that Dr. Holland's closing remarks expressed the almost unanimous opinion of ophthalmologists concerning operative procedure for cataract—that is, that the least expert operator, as Dr. Holland said, should take the position of "safety first," while the more expert operator could and would do the intracapsular in selected cases.

DR. WM. E. WILDER thought that Dr. Holland had presented in a very clear way the indications for guidance

of the practitioner in the selection of the operative procedure for cataract. Most operators would be willing to admit the value of intracapsular extraction of cataract, if by this method the result could be accomplished as safely or more safely than by any other method. The question of comparative safety of one method over another was the whole question at issue; and had been ever since the extraction of cataract devised by Daviel superseded the older and more dangerous method of couching. As to the relative safety of the methods of extraction, it was doubtful if the question could be answered with the facts and observations thus far available, except possibly in certain instances for the individual himself. The experience of Dr. Holland, or Col. Smith, or Dr. Fisher, or any of the protagonists of the intracapsular method, could not be offered as a reliable guide for the ordinary operator. The published reports of the men who had had extensive experience with this method did not show that it was any safer, if as safe, as the usual capsulotomy operation.

To determine whether a certain method of operation had advantages over some other method, one might approach a degree of scientific accuracy by comparing results on large groups of cases. The same operator of course should do the work. He had suggested to Dr. Fisher, when the latter announced that he expected to operate on a large number of cataracts in India, that he select groups of 200 cases of as nearly similar character as previous study could determine, and then operate on one group of 200 by the combined capsular method, on another group by the simple extraction with a small peripheral iridectomy and on still another group of 200 by the intracapsular method, keeping track in each case as to the vitreous prolapse, iris prolapse, hemorrhage or accidents of any kind at time of operation; then study and record in each group the degree of reaction, presence or absence of choroidal or retinal detachment or any other evidence of traumatism or inflammation that might be attributable to the operation itself. From the description given by Dr. Holland of the vast amount of meterial and the work to be done by such a small number of workers, it was quite evident that such a study of cases would be well nigh impossible. But it certainly would furnish a more reliable means of comparison of methods than any yet offered.

One of the most important steps in the operation of cataract, no matter by what method, was the induction of complete anesthesia, and complete blocking of the action of the orbicularis so far as possible. This was done not alone with 4% cocain solution. dropped into the conjunctival sac, but by deep injection of 1% or 2% solution of novocain, along the lower and temporal orbital margins; and also the injection of a few drops at the upper nasal margin of the orbit, to reach those fibers of the muscle attaching to the inner canthal ligament. In addition, the deep injection into the orbit of about 1 c.c. of the same novocain solution, so directed as to reach the region of the ciliary ganglion, not only deepened the anesthesia caused by the cocain, but to a certain degree blocked the muscle cone of the eyeball. Properly done, the patient seemed to have no power of squeezing the lids. In his experience, this method of preparing the eye had proven of distinct value as a means of preventing accidents.

Dr. Holland was to be commended for his valuable suggestion that discrimination be used in the method to be employed for extraction, and that one should not start with the determination to do an intracapsular operation whatever might appear.

In the class of cases in which it would be desirable to remove the lens in capsule, namely, immature cataracts which advance very slowly, reducing the vision to 20/200 or a little less, it was usual for the capsule to rupture more easily than the zonule, in his experience; but even so he felt it was safer to extract by the ordinary method and to remove cortical remains from the chamber by irrigation.

DR. C. C. CLEMENT felt that in his hands the capsulotomy operation was the safer. He had postponed attempting the intracapsular method until he had a patient fifty years of age with immature cataract, a contractor, who was unable to carry on his work. He felt that the operation was a necessity, and in spite of the fact that men of this age were not considered good subjects, found the operation surprisingly easy. Shortly afterward an almost similar case was operated with the same comparative ease and same good result. In such cases he agreed with Dr. Holland that one should select the operation which promised the best result, and he believed the intracapsular operation was indicated.

DR. MICHAEL GOLDENBURG believed that Dr. Holland's paper was probably the fairest, the most modest, and the most worthy presentation of this subject that had been brought before the society. There were no extraordinary claims made by the author; his judgment was based not on the visual results, but upon the surgical picture presented before discharge. The manner in which he introduced the subject would indicate that his procedure would necessarily be the method of choice—the necessity of doing such a vast amount of work over a very short period, in a people frequently unable to make themselves understood even by the native attendants. Might there not be some difference between the Indian and the white man, some difference in their nutrition that might account for the ease with which they rupture the suspensory ligaments. It is well known that these people are undernourished, which might be conducive to arteriosclerosis and could influence these ligaments.

When Colonel Smith was here he performed a number of these operations at the Infirmary, five or six in Dr. Goldenburg's service, and in spite of Colonel Smith's vast experience and unquestionable skill, the results were distinctly disappointing. Some months later, when Dr. Goldenburg was interested in the Barraquer method and was considering trying it, he developed a method which he thought superior to anything heretofore presented. In about eight cases, he lost vitreous in one and obtained fairly good results in all. At this time, with the assistance of Dr. Von der Heydt, the irides of the cases so operated were examined with the slit lamp, and it was found that all of them presented a large hernia of the vitreous. In one case the vitreous protruded into the anterior chamber, and when the iris contracted or dilated the vitreous would be moved about like a fluffy piece of cotton. After that, he returned to the capsulotomy operation. When the posterior capsule of the lens is removed, a powerful force in retaining the vitreous in place is destroyed. Salzman had stated that there was no such thing as a hyaloid membrane, and that no membrane existed between the vitreous and the internal limiting membrane of the retina; also that the fibrillae of the vitreous were connected with the epithelium covering the ciliary process. This was particularly noticeable in the valley of the corona ciliaris. The fibrillae in many cases passed right across posterior to the lens capsule. In removing a lens in its capsule, a very wonderful protection to the vitreous was destroyed.

From his own experience, which was rather limited so far as this method was concerned—the eight he performed by his own method, the ones under Dr. Fisher's direction, and those done by Colonel Smith—he was convinced that he would not want the operation done on his own eyes. Were it possible to retain the vitreous humor in its proper position by removing the lens entirely within the capsule, it would be an ideal procedure, but he believed it would be some time before such a technic was developed.

DR. WILLIAM A. FISHER was very pleased at the reception accorded this paper. He congratulated Dr. Clement upon doing the intracapsular operation. It was not to be expected that the method would be selected in all cases, nor would it be well to persist in the intracapsular method when the lens would not be delivered with what might be called safe pressure. It would be far better to change the method of operation rather than make too much pressure. It would also be

well, for all who were beginning to use the intracapsular operation, to select the cases and not attempt any under sixty years of age.

Dr. Wilder's statement that the subject had been presented in a fair manner would indicate that he was in a more receptive mood. Undoubtedly, he could remove many lenses in capsule if he would give the lens a chance to come out before cutting the capsule. It was probable that many of the members of this society could operate by the intracapsular method if they would simply try it on selected cases. There were often advantages in doing the double operation, but this would not become popular with capsulotomy operators, because it was seldom that one saw both lenses completely opaque. More than one-half of the operations presented in this paper were double.

In the speaker's three trips to India, he had not noticed any more complications in the double than the single operations, nor had Colonel Smith nor Dr. Holland. From this point of view, there are many advantages in doing both at the same time, especially if the first operation was free from complications. Dr. Holland's opinion was that in competent hands the Barraquer operation had advantages. One could be an expert operator provided he had enough experience, and this could be obtained by operating upon six weeks old kittens in the incision, iridotomy or iridectomy, the capsulotomy spoon delivery, and even the expulsion of the lens. When an operator had had this experience, together with good lens control, he could operate by any method and expect good results.

Dr. Holland (closing) said that he felt he had achieved the object of his paper, which was to put the matter in a fair way, and he believed from the general discussion that this had been done. He had an open mind, and was willing to adopt any method that offered the most satisfactory results. Concerning Dr. Wilder's suggestion of operating 200 cases by one method, 200 by another, and still 200 by another, he believed this would be interesting if the surgical results only would be acceptable, because, as stated in the paper, it was impossible to keep track of the cases and get final visual results. In some cases when the patient was jumpy and kept pressing the lids, chloroform had been used with good results. Until he had seen the intracapsular operation and observed the results, he had an unfavorable opinion of it. But, since then, he was of the opinion that to get best results the lens in capsule must be removed by some method. He had done many capsulotomy operations before beginning the intracapsular. If the slit lamp was to be used, it should be before the operation, not after; its great magnification might show imperfections no matter what method had been used, and even tho the patient had normal vision.

A certain number of cases of prolapse of the iris would occur after any method of operation, but the operation which offered the least number had many advantages. Barraquer reported less than anyone, which might be due to his superior skill. The speaker thought that prolapse of the iris caused lower vision, than a slight loss of vitreous, as had been stated in his paper.

Clarence Loeb,
Corresponding Secretary.

HOUSTON OPHTHALMOLOGICAL AND OTO-LARYNGOLOGICAL SOCIETY.

February 3rd.

Dr. Lapat, President.

Luetic Chorioretinitis.

Dr. E. L. Goar presented the patient, a girl, age 13; seen first in Sept. 1919. At that time vision was light perception in the right eye, and 20/200 in the left. The retinoscope showed a refractive error of plus 1.00 with plus 0.50 axis 75° in the right eye, and plus 1.00 with plus 0.50 axis 180° in the left eye, vision remaining the same. There were numerous bone corpuscle shaped areas of pigment thruout both retinas. Wassermann was plus. Intensive antiluetic treatment was ad-

vised and carried out. Jan 17th, 1920. Condition the same. Jan. 12th, 1923. Large exudate in right vitreous.

July 9th, 1924. She complained of severe headache; the right cornea was hazy; small hyphemia was present. A few days later tension was 70 (McLean); the anterior chamber was filled with blood. Hot applications and 10 gr. of sodium salicylat four times daily, relieved the pain. Atropin was used early, but stopped with the appearance of high tension. Absorption of blood in the anterior chamber was very slow.

Sept. 5th. There was only partial absorption. There was no recurrence of pain and the tension gradually dropped until it is now 30.

The right pupil is now widely dilated; most of the anterior layers of the iris have been absorbed; leaving only a thin rim of iris stroma around the periphery, on a broader pigment ring. Behind the pupil is a thick, dark gray mass, upon the anterior portion of which lies a clot of unabsorbed blood. The massive exudate can not be seen clearly with the ophthalmoscope because the light is not well reflected. Transillumination shows a rather dark irregular mass, transmitting the light irregularly. The lens has been absorbed or luxated as only one Purkinje-Sanson image can be seen. The left eye shows a star shaped opacity of the posterior pole of the lens, posterior cortical cataract. There are many mucoid like vitreous floaters. The periphery of the retina in every direction shows irregular pigment masses, some shaped like bone corpuscles, others spherical in nature. The disc has the yellowish appearance found in retinitic atrophy. This condition has to be differentiated from retinitis pigmentosa and intraocular tumor.

Infectious Uveitis.

Dr. Robinson presented a case of infectious uveitis in which the focus of infection was not yet discovered.

The program consisted of a paper by Dr. Robinson "Some Observations on Blocking the V and VII Nerves as Accessory to Cataract Operation," and a paper by Dr. Lapat "Eye Injuries and Calculation of Permanent Disability."

Dr. Ray K. Daily, Secretary.

SAN FRANCISCO COUNTY MEDICAL SOCIETY.

Eye, Ear, Nose and Throat Section.

January 27, 1925.

Copper in Lens. Glaucoma.

Dr. K. Pischel reported further progress in a most unusual case, the resumé of which is as follows: A fine piece of copper from a dynamite cap explosion lodged inside the eyeball on the ciliary body. The accident occurred 12 years ago. The eye at present shows copper deposits in the lens and glaucoma.

The foreign body was localized according to Sweet's improved eye localizer in the ciliary body 8 mm. below the center of the cornea, while localization with Dr. Pischel's markers (California State Jour., Medicine, Vol. 18, Oct. 1920, p. 408) put it just inside of the sclera on the ciliary body.

December 16, 1924 a vertical incision thru the sclera upon the foreign body was made; no foreign body was seen or felt; an extensive cyclodialysis was then added.

As the tension remained high in spite of adrenalin injections, iridectomy upwards was performed December 19, 1924. A few days afterwards the patient went home. He reported January 6 (18 days after the iridectomy). Tension was 30; eye pale with the exception of the point of the incision for the iridectomy under the upper lid and there, under the conjunctiva, was seen with Zeiss loup a fine sharp edged foreign body, showing reddish reflex under the corneal microscope. The roentgen picture showed only this foreign body, none in the former location below the limbus. After slitting the conjunctiva the foreign body was removed and proved to be a very fine piece of metal 1 mm. long.

How did the foreign body get there? Dr. Pischel's explanation is this: At the cyclodialysis the foreign body was pushed into the anterior chamber and at the iridectomy it floated under the conjunctiva and became lodged there.

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JEAN MATTESON, ROOM 1209, 7 West Madison Street, Chicago, Ill.

EYESTRAIN.

The common use of the phrase eyestrain proves that some such phrase is needed to designate a common condition. But this one, from the philologic point of view, is badly chosen. It tends to fix attention on the eye in connection with a condition that is connected with the function of vision. But the condition is not confined to the eye, nor are its most important manifestations thru the eye.

The real character of "eyestrain," its importance, the danger that in future it will become more important, the attitude that must be taken toward it, by both ophthalmic physician and patient, are most strikingly indicated by Dr. Frederick A. Kiehle of Portland, Oregon, in his Presidential Address delivered before the Pacific Coast Oto-Ophthalmological Society. Dr. Kiehle said:

"Certain tendencies in modern life may well create apprehension as to the ability of the human eye to withstand the constantly increasing demands upon it. We may shudder at the picture of the youthful Lincoln reading his Aesop and his Bunyan by the light of the flaring pine knot, but as society was then constituted, daily life required comparatively little ocular energy. We are guilty of far greater offenses towards our eyes, from the hours spent in kindergarten, thru school and college and all the aftercoming years of life. Our entire educational scheme is based upon the acquisition of concepts thru visual paths.

Attention cannot well be fixed, without looking in the direction of the sound. The average individual must needs see a word before deciding whether it is spelled correctly, must see a Latin or a French phrase before attempting to translate it. If he hears a foreign phrase he finds himself visualizing it, in printed or written form. Visual images comprise the great part of the contents of our minds. It is for the psychologists to say why the visual centers are so much more amenable to training than their auditory brethren, and why attention and concentration function more actively when aided by sight. Here, too, is a problem to test the mettle of otology—the development of a system of education that shall make at least equal demands upon the auditory channels, requiring that they bear an increased share of responsibility, and bring about a corresponding relief for the now overtaxed visual tracts.

We cannot surmise what new demands the approaching decade, not to

say centuries, may make upon the human ocular apparatus. We can only conjecture by glancing at the past. We note the tremendously increased necessity for instantaneous muscular and accommodative adjustment, made imperative by the excessively rapid locomotion of the day. The temptation to sustained use of our eyes is continuous during all our waking hours. The inviting signboards, the street car advertising cards, the display windows that beckon so enticingly, the dazzling electric signs, the incessant lure of the movies, all make for ocular weariness. Neither can we overlook the factor of the abandonment of healthful country life and the concentration of population in the cities, with attendant increased number of sedentary and mechanical occupations, all requiring close visual application.

Ten thousand objects unknown to our boyhood are today staple articles of commerce, all from the hands of skilled mechanics thru long hours of close application. The chemist, close-housed, now produces in his laboratory a thousand substances to procure which men formerly sailed the seven seas. Modern life is yearly more complex and more replete in conditions that provoke retinal fatigue. What will come of this increased close application and intensified ocular strain?

Asthenopic patients generally fail to understand the factor of their physical limitations; they realize reluctantly, for example, that even a perfect correction of a refractive error neither warrants indiscriminate and indiscreet use of the eyes, nor bestows unlimited muscular and accommodative power. The factor of individual capacity must not be overlooked. In our consultations do we emphasize this sufficiently, or study with enough care the particular requirements of the patient's occupation or profession?

A recent writer remarks: "The healing art of the physician can be effective only up to the limit of stress of the human machine to which it is applied." Thus the patient often overlooks an important element in the analysis of his trouble and may be greatly helped by the reminder that his ocular apparatus is but part and parcel of his nervous system, that his eye both embryologically and physiologically is an off-shoot from his brain, and functions from it, and that it fatigues with the onset of nervous exhaustion. An excellent ophthalmic motto for workers who pour over desk or bench, parodying the warning in your hotel rooms, is this; 'Stop, have you anything left?' "

The above statements imply so broad a view of this subject that we rejoice to emphasize its importance. The poorly chosen term will not be displaced unless a better one is found to take its place. We use the word glaucoma to designate something wholly different from the light from the pupil it originally meant. Nerve strain connected with seeing, "visual strain," might be better. Perhaps the old term, "asthenopia," could be given this wide meaning; but whatever the words used the important thing is that the broad understanding of the subject should be attained.

E. J.

DOSAGE IN OCULAR THERAPEUTICS.

Alchemists mixed and separated, dissolved and evaporated, crystallized and distilled, observed and speculated for a thousand years, to gain a partial mastery of a few substances. But when Black, Scheele, Cavendish, Lavoisier and Priestley began to weigh exactly their filtrates and residues, their ingredients and products, a science was born; and one hundred and fifty years have brought to light the marvels and miracles of modern chemistry. Observations then became exact, hypotheses could be put to the proof. The results of one worker could be tested and proved or disproved by another. Each new fact became the foundation of an endless series, and chemistry, linked up to physics and biology, took its place in the widening domain of science.

Exact dosage is the basis of therapeutics. It is accurate and definite therapeutics. Exactness in the correlation of forces used and results ob-

served, is an essential condition of any scientific knowledge and progress. This is now understood as to the use of chemicals and drugs, in the treatment of disease. Every dispensatory specifies exact amounts of each ingredient, every pharmacopea and text book give doses. The joke on the student who said he would give a teaspoonful of croton oil; and, trying to correct his answer, was told the patient was already dead, is appreciated by every medical man. Strychnia is a nerve tonic, or a violent convulsant poison, mustard a pleasant condiment or a violent emetic, according to the dose.

The uninformed laymen is satisfied to know that he is taking thyroid extract, or is not being "dosed with mercury"; associating but a single idea with the name of each drug. The well-informed physician attaches practically no significance to the mere name of the drug, apart from the amount that is being given. The same exact knowledge of doses and their effects, must be acquired and applied, with reference to such remedies as heat, light, electricity, the X-ray or radium. Exact methods of measuring and designating all of these therapeutic agencies, are available and can be applied. All reports intended to establish, or disprove their therapeutic values should include the units of force used, amount and intensity, duration and distance of exposure, screening, etc. Without these details, mere statements of benefit, or harm, are merely worthless, or positively confusing.

In one way or another heat has long been employed for the relief of eye disease. It has been universally known that on one side deficient heat caused tissue death by freezing. On the other hand, there was tissue death and disorganization by heat excess; and between exists an optimum temperature, for each organism or tissue, at which it most easily and most perfectly preserves its health. The means of measuring the amount of heat has been in general use, for many years and for many purposes; yet only a few have tried to make exact, accurately controlled applications of heat, in ocular therapeutics.

An oculist applying heat to the eye for any therapeutic purpose can never learn the full significance of the results obtained, and the way to duplicate, or improve on them in another case, unless he carefully notes the exact degree of heat employed and the length and circumstances of the application. The boiling and freezing points of water give us approximate notions of dosage in some cases. But between these lie lethal and most favorable points for all tissue and microorganisms; and to know these will greatly extend our therapeutic resources.

With light, we have not only harmful extremes of intensity, but the wide range of wave length and color; from infrared penetrating deeply, to ultraviolet concentrating its effects on the surface and causing the lesions of snowblindness and photoelectric ophthalmia. Any exact information about phototherapy must include details regarding wave length of radiations used, intensity (source and distance of source), length of exposure and intervals between applications. To have a copyrighted name for the particular lamp used may serve all the needs of the salesman; but it does not help to understand any scientific facts about phototherapy or diathermia, or furnish any basis for exact and rational therapeutics.

With reference to the X-ray and radium, there has been the greatest looseness and confusion with regard to dosage. Often it is merely stated that radium was used and the patient did, or did not get well and remain well. It does not help the reader, that the radium was applied by an expert, who did know the dosage and how it should be modified to meet the needs of the particular case; unless it is intended that all such cases should be sent to that expert. If the case report be worthy publishing, it should carry more than the claim that a certain radiologist can cure cancer.

Justice to the reader demands that an idea of the exact dosage producing these effects should be conveyed as clearly as possible. This is all the more necessary for remedies, the exact dosage and indications for which are still

uncertain. Exact notes are needed for the reader and also for the writer, who is attempting to educate himself in a new therapeutic specialty. Dosage should be repeated and emphasized all thru the literature, until general understanding and agreement on it are reached, and the facts fixed in the memory of the practitioner. This is especially important for an agency like the X-ray, which has caused cancer as well as eradicated it; or radium, which can cauterize as well as cure.

E. J.

AFTER THE LONDON CONVENTION.

Each week in June and even the first few days of July, American ophthalmologists have been sailing to attend the London Convention. These official representatives to the Congress, Dr. Walter R. Parker from the Section on Ophthalmology of the American Medical Association, Dr. de Schweinitz from the American Ophthalmological Society, and Dr. Lee M. Francis from the American Academy of Ophthalmology and Oto-Laryngology will be well supported.

Most of those who go have planned more or less vacation touring in connection with their trip; and many will include visiting the meetings of the Section of Ophthalmology of the British Medical Association at Bath; or the German Ophthalmological Society at Heidelberg, or both.

Bath is a few hours ride to the west from London, close to Bristol, near Devon and Cornwall to the southwest and Wales to the Northwest. Winchester and Salisbury are little out of the way in going there, and Stonehenge between the latter and Bath. To be there July 21st to 24th, opens the opportunity for seeing a most interesting part of Britain. It is to be hoped that some of the Americans at London will avail themselves of the invitation printed p. 586.

The date of the Heidelberg Congress was changed to make it convenient for those from other parts of the world who attend the London Convention to visit it also. The German Ophthalmological Society has been meeting elsewhere of late years, in Vienna and Jena. This year it comes back to its familiar surroundings, and opens with the customary informal social gathering the evening of Sunday, Aug. 2. Those who like strenuous meetings will be gratified with scientific sessions at 8.30 A. M. and 3 and 7 P. M. on the three succeeding days. Even one who cannot follow the scientific discussions in the German language will add to his memory a picture of meetings that have been very important in the development of modern ophthalmology.

GRADUATE COURSES.

The short courses, clinical days, meetings for demonstrations and round table conferences, that are arranged by special as well as general societies, are growing in number and popularity. They seem to be the best method yet devised, to meet the needs of those in regular practice, who cannot leave their offices for long periods. Something of the kind is a necessity for anyone who becomes conscious of weak spots in his training, such as have always occurred in the hit or miss, independent plan of preparation for special practice, that has prevailed heretofore. It is also the best way to keep up with advances in diagnostic and operative methods, that must be known by one who wishes to do the best work possible.

This year the two weeks course given under the Colorado Ophthalmological and Oto-Laryngological Societies, at Denver, August, 10 to 22: and the Instruction Section of the American Academy of Ophthalmology and Oto-Laryngology, at Chicago, Oct. 15 to 17, will each give a series of round table discussion luncheons, such as have proved attractive and profitable in both of these courses as given in previous years. The programs arranged for such courses are generally rather strenuous. But where both specialties are dealt with, there is opportunity for electing the hours most desired, and thus finding some time for recreation.

E. J.

BOOK NOTICES.

Pathology and Bacteriology of the Eye. E. Treacher Collins, F. R. C. S., Consulting Surgeon to the Royal London Ophthalmic Hospital, etc. and **M. Stephen Mayou,** F. R. C. S., Surgeon to the Central London Ophthalmic Hospital. Second Edition, Cloth, 8vo., 765 pages, 4 colored plates and 306 figures in the text. Philadelphia. P. Blakiston's Son and Co., 1925.

The arrangement of this book is original, and the grouping of the facts with which it deals is highly helpful for their understanding and retention in the memory. The central idea of this arrangement is thus stated in the preface: "Pathology is really disordered physiology, and the classification of diseases of the eye on a physiologic rather than an anatomic basis, adopted as a novel procedure in the first edition, has been retained in the present one."

Broadly defined, pathology is "the science dealing with the theory or causation of disease." It is commonly held to include pathologic anatomy and histology with a large part of symptomatology. Bacteriology, the science of bacteria, belongs with it, in so far as microorganisms cause disease. However, it is only those phases of pathology and bacteriology related to a single organ like the eye, that can be dealt with in a single volume, with anything like completeness. But bacteriology being such a new, rapidly expanding science, which interests the surgeon on the side of pathogenesis, it is in every way desirable to have the related facts regarding it incorporated in a treatise on pathology.

Some careful reading of this work and use of it as a book of reference, show the value of such a grouping of its material, in making easier the yoking up of symptoms with underlying causes, in bringing together in the mind conditions of disease that have relationship with one another; thus giving a broader firmer grasp of the scientific facts of ophthalmology, when it comes to applying them to the problems and needs of the individual case in practice. Furthermore such a grouping of facts makes the subject more interesting.

In America, at least, there is a broader and more general interest arising in ophthalmic pathology; probably connected with better undergraduate training in pathology as a fundamental branch of medicine. Addresses like that of Mr. Collins, at the Washington International Congress, on the abiotrophies, or discussions of points in pathology, or the bacterial causes of disease, awaken more general interest than formerly. The candidates appearing before the American Board for Ophthalmic Examinations are better prepared in this direction than those of former years.

It is certain that more attention will be given to study of this phase of disease, henceforth; and as a consequence there will be a better understanding and more thoro application of what is acquired by clinical training and experience. He who wishes to put and keep himself abreast of the times, in this most developed and rapidly advancing branch of scientific medicine, will find this the best book in the language to turn to for assistance.

The arrangement of matter is logical, and when this is understood the finding of desired information the book contains is easy, and the presentation of subjects is clear and interesting. There is a good index, so that it can be used as a reference work from the start; but the systematic reading of the volume, supplemented by use of the microscope in the study of a few well stained appropriate slides, will do more to widen the scientific horizon of many a man established in ophthalmic practice, than any other equal expenditure of time that we can suggest. Even a study of the plates that have been published in this and preceeding volumes of the A. J. O., in connection with such reading will be very helpful to anyone who has a moderate knowledge and appreciation of the cell characters that such plates represent. E. J.

Many important changes and additions in and to ophthalmology have taken place in the thirteen years since the first edition of this book was published, during which time our knowledge of the pathology of the eye has grown apace. The first edition was a volume in the International System of Ophthalmic Practice. This one is a separate and independent work. Both E. Treacher Collins and M. Stephen Mayou have enjoyed exceptional opportunities for the study of the pathology of the eye, evinced by their numerous separately published articles. The book has proven to be of great value to the ophthalmic profession.

The diction of the book is particularly good. Altho supremely technical, the subject matter is described in such elegant English that the very print itself seems a mental picture, easily seen by the reader, in contrast to works on similar subjects in another language, which appear difficult of reading and seem dry as dust. This book is indeed a marvel. It is beautifully illustrated, containing some three hundred pictures. The subject matter is not a description of specimens and methods, but goes into the causes of these anomalies and disease conditions and their relation to the whole human system.

The facts and theories of which our conceptions of the pathology of the eye are made up, are the outcome of the work of an immense number of different observers. The authors have cut the Gordian knot, and have not given voluminous references to the many separate articles. Especially to be noted in this second edition, is the addition of observations on slitlamp microscopy, with further additions on glaucoma and hypertony, and its opposite hypotony. The increase in our knowledge of the nature of immunity and the influences of antibodies have been fully considered in the chapter on inflammation.

An appendix of forty pages on laboratory methods and a complete index close the volume. It is highly recommended.

H. V. W.

Transactions, American Ophthalmological Society, Vol. 22, Sixtieth Annual Meeting, 1924. Cloth, 8vo.; 425 pages; 29 plates, 3 in colors; and 10 illustrations in the text. Philadelphia. Published by the Society.

The meeting, the transactions of which are recorded by this volume, seems to have been attended by 85 of the 187 members of the Society. The papers read before it numbered 16, there were 8 new instruments or pieces of apparatus exhibited; and 5 pathologic slides were demonstrated. There are almost 50 pages of discussions of the papers presented. There are reports on the teaching of ophthalmology, both undergraduate and graduate; and three biographic notices of former members.

Among the interesting matters recorded in the minutes of the meeting, we note the first award of the prize medal of the Society, bearing this inscription: "To Prof. Doctor Ernst Fuchs, Teacher, Friend. From the American Ophthalmological Society—1924."

The usual high standard of the transactions of this society is fully maintained by this volume. The individual papers have been listed in CURRENT LITERATURE, under their respective classes of subjects. Six of them have been published in this journal, but these are not all that are of high excellence and importance. There are also others that we would gladly have published, and the general average of all was high in permanent worth and interest.

Again, the most important thing we can say to our readers about this series of volumes is that they should, as far as possible, be placed on the reference shelves of every ophthalmic library. If it were not so easy for any ophthalmologist to get in touch with the Secretary of the Society, Dr. Thos. B. Holloway, 1819 Chestnut St., Philadelphia, we might, as a means of promoting ophthalmic education, offer to receive subscriptions for the next volume.

E. J.

Section on Ophthalmology, American Medical Association. Presession volume. Paper, 8vo., 350 p., 63 ill. Chicago, American Medical Association.

This is the volume containing the papers, 20 in number, to be presented before the Section, at the Atlantic City meeting; and subsequently published, with the discussions they elicit, in the Transactions of the Section. After the meeting those that are supposed to be of most general interest to the profession at large, will also appear in the Journal of the A. M. A. There are also reports submitted to the Section, by five committees on: The Knapp Testimonial Fund, The Proposed International Congress for the Conservation of Vision, On Compensation for Eye Injuries, Hereditary Blindness, and On Visual Standards for Drivers of Motor Vehicles.

The publication of such a presession volume, almost a month before the time for each annual meeting, has been kept up for the Section for nearly 20 years. It has had much to do with making this section one of the largest and most regularly attended of the sections of the Association. It makes possible the brief presentation of the paper, by calling attention to its important points; and the reading of carefully prepared remarks in discussion, while allowing the most time and opportunity for expression of thoughts and views developed by such presentation and reading.

This particular volume is quite up to its predecessors in breadth of subjects discussed and scientific interest attaching to them. It should serve to attract ophthalmologists to the meeting. But those who are prevented from attending, may thru it, be kept in close touch with the activities and ideas that will there claim the attention of those who are present. **E. J.**

Report on Second International Congress of Military Medicine and Pharmacy, Rome, May-June, 1923, by **William Seaman Bainbridge,** Commander Medical Corps, United States Naval Reserve Forces.

This publication contains abstracts of 103 studies, relating to the evacuation of sick and wounded, the collaboration of military and civilian authorities in matters of social hygiene, physical education and prophylaxis, studies of disinfestation and disinfection in times of peace and war, treatment of wounds of chest, chemical laboratories and special communication; being abstracts from the addresses delivered at the Rome meeting, May-June, 1923.

While there were no ophthalmologic articles presented, it contains material of considerable importance to the specialist as well as to the general practitioner.

The historic value of these reports render the present volume an important contribution to the records of the World War, as well as to the advances in the care of the soldier and of civilians. Standardization of acceptable methods of procedure and medical organizations, in all the civilized countries, is noted.

The courtesy and hospitality of the Italian Government brought the Military Surgeons into harmonious association. It is hoped that these congresses have started a movement by which an International Association of Military Surgeons may evolve.

H. V. W.

CORRESPONDENCE.

British Medical Association.

Section of Ophthalmology.

To the Editor: I am enclosing a provisional program of the above section, in order to give you some idea of what we are doing at the British Medical Association Annual Meeting at Bath (July 21st to July 24th).

The officers of the section would be pleased if any American ophthalmologist who is in England at that time would care to take part in the section.

Yours faithfully,

Bath, England R. Colley.
Hon. Secretary.

PROVISIONAL PROGRAM.

General Discussions.

1. Eye injuries and interstitial keratitis.
   Opener—Mr. Wm. T. Holmes Spicer. (London)

2. Ocular Pain.
   Opener—Mr. A. Freeland Fergus. (Glasgow)

Occasional Papers.

1. Phlyctenular conjunctivitis and keratitis—causes and prevention.
   Mr. N. Bishop Harman. (London)
2. Visual hallucinations of sane people.
   Mr. A. Wm. Ormond. (London)
3. Amaurosis.
   Mr. C. H. Walker (Bristol)
4. Conservative treatment of glaucoma.
   Mr. J. Burdon Cooper. (Bath)

A CORRECTION.

In the list of those certified by the American Board of Ophthalmic Examinations, (see vol. 8, p. 72) the name Lebensohn, M. H. should read Lebensohn, James E.

ABSTRACT DEPARTMENT

Reprints and journal articles to be abstracted should be sent to Dr. Lawrence T. Post, 520 Metropolitan Building, St. Louis, Mo. Only important papers will be used in this department, others of interest will be noticed in the Ophthalmic Year Book.

Carmi. Relation of Interstitial Keratitis to Trauma. Bollettino d'Oculistica, Dec., 1923.

The author discusses the question of whether or not trauma is capable of causing typical interstitial keratitis in a healthy subject; and how far its influence must be considered in patients with congenital syphilis. The opinions and statistics of other authors are discussed. Of the author's own series of 96 cases of interstitial keratitis, the causes were as follows: hereditary lues 65 cases; acquired lues 14 cases; tuberculosis 7 cases; rheumatism 5; other causes 5.

Eleven cases occurred following trauma. Of these cases, nine were luetic, one showed the "rheumatic diathesis," while in one no other cause was present, except the trauma. In six of the traumatic cases the disease was bilateral; that is, following trauma and interstitial keratitis in one eye, the second eye became affected. Naturally, in nonluetic cases, the disease is less apt to be bilateral, but it was so in one case due to rheumatism.

The author concludes that there is a form of interstitial keratitis due to trauma alone, usually unilateral. The usual condition, however, is that of interstitial keratitis, originating after a blow, in patients with hereditary syphilis. Trauma may also cause a recurrence of a previous interstitial keratitis, in patients with hereditary syphilis. From a medicolegal standpoint, the trauma must be considered as the cause of the interstitial keratitis and the patient must be indemnified, whether or not he has congenital syphilis. The question of whether or not the loss of the second eye should be indemnified is not decided, as the law makes no account of its occurrence. Changes in the laws, with special conditions for accepting patients with hereditary syphilis for insurance, should probably be made.

S. R. G.

Maucione. Cases of Congenital Pyramidal Cataracts. Arch. di Ott., 1924, vol. 31, p. 145.

The author's first case was of a man of 22, who had had poor vision in the left eye since infancy. The opacity was 2 mm. in diameter at its base on the capsule, and was peculiar in being placed eccentrically up and in, so as to be largely covered by the pupil. Its apex was curved towards the pupil and moved with movements of the iris. The rest of the lens was clear, and vision was ⅓ with correction. No opacities could be detected in the cornea. The author considers this a case of primary pyramidal cataract originating in utero. Since there was present no evidence of inflammation or malnutrition, it was probably due to improper closure of the lenticular vesicle, with a persistence of the epithelial peduncle connecting it with the surface. The eccentric position of the

opacity may be explained by an unequal growth of the lens, by which an originally central location could be displaced in any direction.

His second case was of a boy of five, with both lenses completely opaque. The parents had noted small white spots in the pupil at birth, but the child could see fairly well until he was two years old, when the vision began to fail rather rapidly. Large central pyramidal cataracts were present, in the center of each pupil; the point extending into the anterior chamber so as almost to touch the cornea. Both lenses were extracted, the pyramidal cataract being first removed in several fragments. It was easily detached and the delivery of the rest of the lens followed readily. Vision of 1/12 and 1/10 was secured.

Sections of the anterior opacities showed them to be composed of homogeneous lamellae, with flattened fusiform cells between them, more numerous toward the base of the opacity. No trace of the capsule was to be found. This case is also an example of primary pyramidal cataract, since there was no trace of inflammation or opacities in the cornea.

While there is a clinical distinction between anterior polar cataract which is beneath the capsule and pyramidal cataract which is in front of it, the histologic picture is the same in both cases. Rare cases have been found where, as in Case 2, the capsule was missing and had apparently atrophied. After a discussion of the various theories of pathogenesis, the theory of de Lieto Vollaro, imperfect closure of the lenticular vesicle, is held to explain both cases most probably. (Full bibliography, 5 illustrations.) S. R. G.

Wood, D. J. Hydatid Cysts of the Orbit. Brit. J. Ophth. Jan., 1925, p. 4.

Hydatid cysts are common in South Africa. The author divides them into two classes, those within the muscle cone and those without. This difference is very practical, since if the cyst is within the cone or apex of the orbit, the eye will become blind. Its removal is difficult. In those outside the cone the reverse of these conditions obtains. Aspiration, negative Wassermann and absence of inflammation are at least strong presumptive evidence, in a land where hydatid disease occurs.

The author reports three case histories. In one the eyeball was almost dislocated forward. The eye had been blind for four months. The cyst was removed, piecemeal, thru an incision in the upper outer angle. The third day following, the patient was able to see light. In two weeks V.= 6/5.

The second case showed a proptosed eyeball and ulcerated cornea. A diagnosis of "probable glioma" was made. One day following the removal of the eyeball, the temperature went up, two days later it returned to normal. Within a week two ruptured, clear walled hydatid cysts were discharged.

In the third case, the proptosis dated back a year and the eye had been blind six months. Unwisely, an exploratory puncture which brought fluid, was made, without proper preparation of special instruments. Next day edema being intense, efforts were made at removal. In doing so the sixth nerve was injured. Vision = 6/60.

One should have a good light, necessary instruments, take measures to prevent the orbital fat getting into the field of operation, and if preceding the operation by exploratory puncture, care must be exercised to prevent the fluid from getting into the orbital tissues, thus producing a serious reaction.

D. F. H.

Wood, D. J. Ocular Leprosy. Brit. J. Ophth., Jan., 1925, p. 1.

Ocular affections occur, in some form, in nearly all cases of leprosy. In anesthetic cases, desiccation of the exposed cornea occurs. The great cause of loss of sight is iridocyclitis, which is always the forerunner of any specific ocular affection in this disease. Onset is insidious, followed by the acute attack which invariably progresses to occlusion of the pupil, opacity of the cornea, lens and vitreous, with shrinking of the eyeball. Lepromata, contrary to the usual statement, are always present. They may

be very small, lying on the iris. They are pathognomonic. The iris texture is rotten and atrophy is always present. No matter how adherent the iris, glaucoma never results.

With the slitlamp profound changes are observed, such as complete destruction of the tissue so that no stroma, sphincter or uveal tissue can be recognized in the neighborhood of the pupil. The author publishes two illustrations in which he depicts these iris changes. In this same case the aqueous was filled with circulating inflammatory cells. The cornea shows large numbers of white spots, which are composed of tiny discrete points. They are at varying depths in the corneal tissue. They diminish as they pass inward. Some may be close to Descemet's membrane.

The case from which the author gives this description was treated with subconjunctival injections of bicyanid of mercury to which was added purified ox gall. It showed definite improvement from the start. While the time is too short to judge of the full benefits of this method, the author feels that his hopes have some good foundation.

D. F. H.

Friedenwald, Harry and **Jonas S. Epithelial Dystrophy of the Cornea.** Brit. J. Ophth., Jan., 1925, p. 14.

In connection with the epithelial dystrophy of Fuchs, and the more recent contribution by Graves of similar endothelial changes and their possible relationship, the author reports two groups of cases. First, five cases, showing changes in the endothelial layer of the cornea but no alteration of the epithelium. The cases were all in women above forty. No general or local disease seemed specifically related to the picture. Two of these cases have been followed for over three years, during which time no change could be observed. It is interesting to note that one of the cases, the last in the table, was first seen eight years ago, before the use of the slitlamp corneal microscope. At that time a fine granular haze in the anterior portion of the eyes was noted, but it was not possible definitely to localize this haze.

The second group contains a description of three cases of dystrophia epithelialis corneae. An endeavor is made to illustrate the relationship, which the author believes exists between the changes in the corneal endothelium and the epithelial dystrophy. In one case the endothelial changes clearly preceded those in the epithelium, and in the other two there is excellent presumptive evidence that the same course of events took place.

D. F. H.

Thomson, E. Lateral Ocular Muscle Balance in School Children with Special Reference to Squint in Myopia. Brit. J. Ophth., March, 1925.

The author based his statistics on a table containing the record of examination of 486 school children, ranging in age from six to seventeen years. The tests were made before and also after spectacles were prescribed. The cases were arranged in four groups, the hypermetropic group, the myopic group, the anisometropic group and the emmetropic group. In the myopic group of 159 cases, exophoria is to esophoria as 34% is to 64%. The ratios between exophoria and esophoria as recorded in the present article, are similar to the ratios between divergent and convergent squints in myopia, as tabulated in a previous article. To make the demonstration, the ratios can be set out as follows:

In 159 cases, of the socalled myopic type, (see table) with and without correction, exophoria is to esophoria as 1 to 1.83. Or, omitting from the above binocular mixed astigmatism and emmetropia with mixed astigmatism, there are 117 cases, with and without correction, in which exophoria is to esophoria as 1 to 1.43.

In 790 cases of myopia and myopic astigmatism in one or both eyes (Brit. J. Ophthal. July, 1919) divergent squint is to convergent squint as to 29 to 45, that is 1 to 1.55; or, omitting doubtfuls from the above, as 27 to 38, that is 1 to 1.40.

D. F. H.

Rossi, V. Course of Surgical Wounds in the Eye in Experimental Hyperthyroidism. Arch. di. Ott., 1924, vol. 31, p. 212.

From the clinical observation, that wounds in cases of hyperthyroidism healed more rapidly than in normal individuals, it has been supposed that the thyroid secretion helps to neutralize the bacterial toxins. In thyroidectomized animals the blood serum was found to contain less bacteriolysin and opsonin. Another theory is that its action is thru stimulation of other glands, which have these properties.

Using rabbits, which were injected daily with 1 cc. of thyroid extract, until symptoms of hyperthyroidism appeared, ocular operations (keratotomy and iridectomy) were performed, using each time a normal rabbit as a control. In another experiment thyroidectomized rabbits and normal rabbits were subjected to the same operation. In the four animals treated with thyroid extract, healing was much more rapid than in the controls. The thyroidectomized rabbit showed a much more severe reaction, and died fifteen days after the operation. Three cases of severe keratitis were given injections of thyroid extract which apparently exerted a favorable influence on the course of the infection. Without drawing a definite conclusion the author believes the effect of the thyroid is thru stimulating other glands and organs to a more intense reaction.

S. R. G.

Esser, F. Diagnosis of Sarcoma of the Choroid. Klin. M. f. Augenh., 1924, v. 73, p. 192.

Esser emphasizes the diagnostic value of puncture, in cases of suspected sarcoma, as again shown by the clinical history of a man, aged 37, who accidently noticed that he could not see out of his left eye. He had been treated by several oculists on account of detachment of the retina for a few months. Near the upper margin of the disc was a detachment, with steep borders, not floating. Transillumination was negative. In the fluid from the puncture, pigmented sarcoma cells were found and the eye was enucleated. At one place in the sclera there was a very small black spot where the tumor had perforated, so that exenteration of the orbit was performed. This might have been avoided if the certain diagnosis by puncture had been made earlier.

C. Z.

Berner, O. Muscular Connection between Dilatator Muscle of Pupil and Ciliary Muscle. Norsk Magazin, v. 86, pp. 123-128.

Such connections have never been satisfactorily demonstrated before, altho their existence has been suspected. The author, in a preliminary report, claims that they do exist and that he has succeeded in demonstrating them, by means of sections cut parallel to the flat surface of the iris. This is a method that he has devised. The dilatator fibers extending in a radial manner outward from the pupil, assume a circular, sphincter like formation at the root of the iris; and from here muscular fibers run into the ciliary muscle, not in a straight radial direction, but more or less diagonally. As to the physiologic significance of these fibers the author advances no theory.

D. L. T.

Chavasse, Bernard. Illumination Required for Instantaneous Color Photography of Eye. Brit. J. Ophth., Feb., 1925, p. 66.

The author determines that, to guard against movement of the eye or lids, the exposure should not exceed one-twentieth part of a second. It is necessary that the illumination of the object be $1 \times 20 \times 4 \times 8 = 640$ times that provided by midday sun. The light of the sun is four candles per square inch of illuminated surface. So that it may be said that for the instantaneous color photography of the eye, an illumination of $640 \times 4 = 2{,}560$ candles per square inch is required. Explosive flash just fails to give enough light. An "Artisol" lantern by means of mirror and condensing lens has an illumination, (38 square feet) of 65 candles per square foot or 2,470 candles. The light passes thru a gate, two-thirds of a square inch, the illumination therefore is 3,705 candles per square inch. For color

photography of the fundus the Artisol apparatus may be perfected for this purpose, by replacing the condensers by a converging mirror by which chromatic and spheric errors inherent in the condensers are eliminated.

D. F. H.

Wright, R. E. Cataract Extractions by Barraquer's Method. Brit. J. Ophth., Feb., 1925, p. 57.

In 1922-23 a series of 250 cases was completed. They were run parallel with 1279 routine "Madras" operations and "simple" operations. First impressions are, that the results are much poorer than in cases of the ordinary capsulotomy method. This was hardly fair as later results tended to become better. Barraquer's operation showed 201 successes and 23 vitreous losses. The routine methods, 1,124 successes, and 20 vitreous losses. The operator is of the impression that phakoeresis is probably more valuable than any other method yet introduced for the removal of the lens in its capsule in selected cases; but it will hardly give a sufficiently high percentage of operative successes to justify its adoption in the following types of cases: markedly bulging eye, friable capsule, Morgagnian cataract, immature cataract with a normal suspensory ligament.

The surgeon must select his operation according to the case and not be tied to any particular method. One of the beginners' difficulties is getting the iris engaged in the cup. The pupil must be fully dilated or an iridectomy done. When, with the Barraquer method a perfect delivery is effected, without injury to the pupil and no subsequent prolapse of iris, one may consider that the most perfect operative result has been achieved, in so far as intracapsular method is concerned. The series reported has not been examined at a sufficiently long interval to give an opinion on the remote postoperative results.

The author further discusses the resulting vitreous opacities and the factor of leaving the vitreous unsupported by the suspensory capsule diaphragm, thus permitting invasion by cellular elements thrown into activity by the trauma of the operation. The vitreous should be treated with respect in all operative procedures on the eye.

D. F. H.

Baldassarre. Subcutaneous Use of Adrenalin in Vernal Catarrh. Bollettino d'Oculistica, Mch. 1923.

On the basis of the idea that vernal catarrh is a disease of individuals of the vagotonic constitution, adrenalin was used subcutaneously with the idea of stimulating the whole sympathetic system. In three cases, which had resisted other methods of treatment, great improvement followed from three to five injections of ¼ milligram adrenalin, every three days. This was especially marked in the cases showing pericorneal lesions only. The evidence that vernal catarrh depends on the vagotonic constitution is reviewed. (See Rossi, Arch. di Ott., 1921, abstracted in this journal v. 5, p. 590). The active stimulations resulting from adrenalin is preferred to the paralysis of the vagus caused by atropin, which has been tried without good results.

S. R. G.

Baldassarre. Paracentesis Combined with Keratotomy From Behind in the Treatment of Serpent Ulcer. Boll. d'Ocul. Oct., 1923.

Recognizing the benefits of keratotomy in serpent ulcer, the author still wished to avoid the inconvenience of the Saemisch incision; the extreme length of the scar occupying the central portion of the cornea and the frequent iris prolapses. Using the small curved sclerotome of Galezowski, the author enters the chamber at the limbus and pierces the central portion of the ulcer from behind, with the point of the knife. The cut may thus be made of exactly the extent of the ulcer, without entering the eye thru diseased tissue, and so running a risk of infecting the aqueous. However, the surface of the ulcer should be sterilized as well as possible, to avoid the danger of carrying germs back into the aqueous when the knife is withdrawn. No prolapses of iris have been seen after this procedure, and it has not been necessary to repeat it in any case.

S. R. G.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. George H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph L. McCool, Portland, Oregon; Dr. Richard C. Smith, Superior, Wis.; Dr. J. W. Kimberlin, Kansas City, Mo.; Dr. G. McD. Van Poole, Honolulu; Dr. E. B. Cayce, Nashville, Tenn.; Dr. Gaylord C. Hall, Louisville, Ky.; Dr. Edward D. LeCompte, Salt Lake City.

DEATHS.

Dr. Frank Jacobi, Toledo, Ohio, died April 2nd of cerebral hemorrhage, at the age of fifty-two.

Dr. Scott Bruce Hopkins, Spokane, Washington, died April 11th, aged fifty-two.

Dr. George F. Zaun, Milwaukee, aged fifty-seven, died May 1st following an appendectomy.

Mrs. Hannah Young, wife of Dr. H. B. Young of Burlington, Iowa, died suddenly at her home April 27th, 1925. The fiftieth anniversary of her marriage to Dr. Young would have occurred on September 22nd of this year.

SOCIETIES.

The regular meeting of the Kansas City Eye, Ear, Nose and Throat Society was held May 21st. After the reports of the officers the address of the evening was made by Dr. James E. May, president elect. The society is just entering its tenth year of organization.

The thirtieth annual meeting of the American Academy of Ophthalmology and Oto-Laryngology will be held in Chicago, October 19-24, with headquarters at the Hotel Sherman. Professor Nager of Zurich will be the guest of honor. A feature of the section on instruction will be round table discussion held each day during luncheon hours.

The regular meeting of the Ophthalmological and Oto-Laryngological Section of the Cleveland Academy of Medicine was held April 24th at the Hotel Winton. The speaker of the evening was Dr. Walter R. Parker of Detroit, who discussed "The Management of Noninflammatory Glaucoma." Dr. Parker's highly instructive and interesting paper was freely discussed by the members of the section.

On March 24th, at the annual meeting of the Pennsylvania, New Jersey and Delaware sections of the American College of Surgeons, at Scranton, Pa., the meeting of the Scientific Section was opened by a paper read, by invitation, by Mr. Basil Graves, entitled, "The Slitlamp in Ophthalmic Surgical Practice." In the evening, a dinner was given by the ophthalmologists present at the meeting to Mr. Graves. On the evening of April 29th, Dr. Graves gave, by invitation, the twenty-third Rush lecture before the Rush Society of the College of Physicians, Philadelphia, on "Microscopy of the Living Eye and the Effect of Transparent and Translucent Living Tissues Upon Light."

PERSONALS.

Dr. Derrick T. Vail, Jr., announces the opening of offices at No. 24 East 8th street, Cincinnati, May 1, 1925.

The following Kansas City ophthalmologists will spend a portion of the summer in Europe: Drs. J. S. Lichtenberg, A. W. McAlester and J. W. Kimberlin.

Dr. H. H. Martin of Savannah, Georgia, was stricken with acute appendicitis on May 8th and was operated upon at the Oglethorpe Sanitarium on May 10th. He has been reported as well on the road to recovery.

Dr. A. F. McCallan, formerly director of the Ophthalmic Hospitals of Egypt, has been elected assistant ophthalmic surgeon to the Westminster Hospital, London, and assistant surgeon to the Royal Eye Hospital.

MISCELLANEOUS.

The National Committee for the Prevention of Blindness reports a 50 percent reduction since 1907 in the number of blind pupils admitted to classes in public schools.

The American Board for Ophthalmic Examinations will hold their examinations Monday, October 19, in Chicago, just preceding the meeting of the American Academy of Ophthalmology and Oto-Laryngology.

The all day course in ophthalmology to graduate students was given at the Harvard Medical School and the Massachusetts Eye and Ear Infirmary. This included diagnosis and treatment in the Out-Patient Department; major operations with follow-up care; courses in refraction; courses in ocular muscle anomalies, diagnosis and treatment; a practical operative course of eight exercises with lectures and quizzes, using pigs' eyes and sheep heads on which the students operated.

Dr. Harry Vanderbilt Würdemann of Seattle has presented the Army Medical Museum, Washington, D. C., with 140 eyes mounted in glycerine jelly. The exhibits in the Army Medical Museum are rapidly growing, the total number now being 1,200. Surgeon-General Ireland and the curator, Major George R. Calender have given ophthalmology a prominent position and are anxious to enlarge the

exhibits. Any specimens sent to the Army Medical Museum, in the latter's care, will be sectioned, mounted and a section returned to the contributor with diagnosis. Any specimens desired for exhibition at medical meetings will be loaned to American eye surgeons without expense.

Under the plans adopted by the Missouri Commission for the Blind "Sight-saving Week" was observed thruout that state May 21-27. Mr. Jacob Lampert, formerly one of the commissioners, has given a fund to provide each year for a popular lecture on some topic related to the prevention of blindness. Mr. Leslie Dana, until recently the president of the commission, has provided for a medal to be awarded by the authority of the commission and the National Committee for the Prevention of Blindness to some one who had been active in this line of public work. The award was made this year to Dr. Edward Jackson of Denver, who delivered the Jacob Lampert lecture on the subject, "Good Lighting in the Prevention of Blindness."

A survey of all government Indian reservations for the purpose of making a record of Indians suffering with trachoma has been begun by the Department of the Interior. The action was taken as a result of a conference with an advisory council on trachoma appointed by the American Medical Association, and composed of Dr. William H. Wilder, Chicago, chairman; Dr. Arnold Knapp, New York, and Dr. William Campbell Posey, Philadelphia. This committee recommended the survey which will be conducted by physicians of the Indian service stationed at the various agencies. It provides for a permanent record of every Indian suffering with trachoma, including sex and age, and the status of the disease, the housing conditions and hygienic surroundings of the Indian family. After the records have been completed, trachoma specialists will be sent to each reservation to treat these patients.

Current Literature

These are the titles of papers bearing on ophthalmology. They are given in English, some modified to indicate more clearly their subjects. They are grouped under appropriate heads, and in each group arranged alphabetically, usually by the author's name in **heavy-faced type.** The abbreviations mean: (Ill.) illustrated; (Pl.) plates; (Col. Pl.) colored plates. Abst. shows it is in an abstract of the original article. (Bibl.) mean bibliography and (Dis.) discussion published with a paper.

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